International Journal Dental and Medical Sciences Research
Volume 3, Issue 1, Jan-Feb 2021 pp 551-557 www.ijdmsrjournal.com ISSN: 2582-6018

Clinical profile and risk factors of wheezing in children under five

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Submitted: 10-01-2021 Revised: 23-01-2021 Accepted: 26-01-2021

ABSTRACT: Aims and Objectives: Wheezing in childhood is not a single disorder and different wheezing associated respiratory illness have been recently described . Not all children who wheeze in early infancy will continue to wheeze into childhood and adult. This study aims to determine the clinical profile and risk factors of wheezing in children under five years of age, in a tertiary care hospital in eastern India.

Methodology: All children less than 5 years of age diagnosed to have wheeze attending to pediatric department of Hi-Tech medical college and hospital , Bhubaneswar are evaluated by collecting base line data of the child, clinical evaluation and investigation.

Parents or legal guardians of infant who gave consent for the study were inter viewed and asked standardized questionnaire about demographic characteristic as well as about wheezing and its potential risk factors. The data are collected and entered into excel sheet , relative statistical tests like percentage, Chi square test ,ODD'S ratio are applied. P value <0.05 considered statistically significant

Results: Wheezing in children under five years of age have heterogeneous group of risk factors and clinical diagnosis. In our study Episodic viral triggered wheeze was the commonest cause of wheezing (22.30%) followed by acute bronchiolitis (20.38%) and bronchopneumonia (16.92%) and moderate bronchial asthma(14.23%).

Wheezing in children less than five years of age was independently associated with male child, family history of atopy , ante natal infection , pre term delivery , NICU admission and overcrowding in the family .

Conclusions: The study of risk factors of wheezing in less than five years of age is important to help physicians identify young children at high risk of developing asthma and to improve public health prevention strategies in order to reduce the morbidity of wheezing in childhood.

Keywords: infant, wheezing, asthma, risk factors

I. INTRODUCTION:

Wheezing is a high pitched whistling sound made while breathing. Wheeze occurs during breathing out (expiration) or may occur during breathing in (inspiration). Wheezing is caused by narrowing of airways[(1)]or due to inflammation .Wheezing is a quite common clinical findings in pediatric patients, especially in the first Five years of life.[(2)] A recurrent wheeze is estimated to occur in one third of preschool age children and can cause significant morbidity, decreases quality of life, and increases the frequency of the use of health care services and economic costs. Data have confirmed that wheezing is clinically heterogeneous in early life in terms of its temporal pattern (i.e., age of onset and duration until symptoms disappear) and its risk factors, which include atopy and genetic or environmental factors, and the outcomes are different for such phenotypes.

Epidemiological studies have found high prevalence rates in this age group[(2-4)].Surveys conducted in developed countries have found prevalence rates between 20-30% Recurrence rates being high,[(5)]prevalence rates seems to be higher in developing countries.[(6-7)].the etiologic diagnosis of wheezing in small infants varies considerably and in most instances the clinical manifestation are associated with viral infection.[(1-9)].it is presumed that asthma can manifest early in infants, however the diagnosis of asthma is difficult in this age group.

II. MATERIAL AND METHOD

The study was conducted over a period of two years(1st September 2018 to 30th August 2020) and include 260 patients diagnosed with wheeze. The study was approved by Institutional Ethical Committee.

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Inclusion criteria

1. Children less than five years of age diagnosed with wheeze
2. Parents of those wheezy children giving informed consent

Exclusion criteria

Children having chronic diseases that could affect the respiratory system like

- Neuropathies
- Myopathies
- Heart diseases
- Genetic diseases
- Severe malformations
- Parents not willing to participate in the study.

All the included patients were evaluated in OPD of the pediatric department and detail of demographic profile was recorded. Detailed clinical history taken regarding associated risk factors such as family history of asthma(especially the maternal or paternal),prematurity, low birth weight, wheezy sibling in household, day care center attendance, early weaning ,exposure to smoking ,exposure to pets, low parental socioeconomic status , low parental level of education, mode of delivery(normal/instrument/caesarian section), NICU/SNCU admission , maternal drug intake during pregnancy ,maternal dietary habit (animal protein intake/cow milk protein intake) ,neonatal antibiotics, neonatal NSAIDS/ Paracetamol.

Wheeze in under 5 children have been classified in various ways

Based on the duration of wheeze the classification is as follow(useful only in population studies, not in clinical practice)[11]

Transient wheeze: It includes children started having wheeze before the age of 3 years and are found (retrospectively) to have disappeared by the age of 6 years (transient wheeze may be episodic viral wheeze or multiple trigger wheeze)

Persistent wheeze: Symptoms that are found (retrospectively) to have continued until the age of 6 years and older (persistent wheeze may be episodic viral wheeze or multiple trigger wheeze)

Late onset wheeze: Wheeze that starts after the age of 3 years (late onset wheeze may be episodic viral wheeze or multiple trigger wheeze) Temporal pattern of wheeze which is used in clinical practice [12]

Episodic (viral) wheeze: Wheezing occurs during discrete episodes, and it is associated with a viral cold; no wheeze between episodes.

Multiple trigger wheeze: in this group child has discrete exacerbations, but also wheezes between episodes.

III. RESULTS

Out of 600 children, clinical wheeze was present in 260 children. The mean duration of wheezing in these children was 2.33 days (range 1-7). Early morning wheeze and Nocturnal wheeze were seen in 18.52% and 29.63%of children respectively while it was seen at other timings in 51.85% of patients. Seasonality was seen in 14.81% of children. Cough was the most common symptom (59.61%, 31.53%) followed by Fever and running nose (41.92%,17.69%) . In line with published literature, cough was present in all children. The mean duration of cough was 3.78 days (range 2-10 days). 52% of children had dry cough. Cough was more in morning (82%). In majority of children, it was non-spasmodic (80%) and in remaining was spasmodic (20%).On examination, all 260 children had a wheeze of which biphasic wheeze was present in 20% of children, expiratory wheeze in 79% patients and inspiratory wheeze was present in 1% of children

Monophonic wheeze was present in 10%of children and polyphonic wheeze was present in 90% of children. Crepitation was present in 46% of children and it was occasional in 12% of children. Conducted sound was present in 44% of children. Viral prodrome is present in 39% of children. 60.3% babies were full term however only 37.3% babies were preterm, 2.4% are post term. Of 260 children 136 children were delivered by LSCS 92 by LSCS and 32 have instrumental delivery. NICU admission was required in 111 (43%) children out of 260 children. In our study we found significant association between antenatal infection(CHI SQUARE 2.58, P value =0.019) and NICU Admission(CHI SQUARE =5.6, P value 0.01) are risk factors of under 5 wheeze

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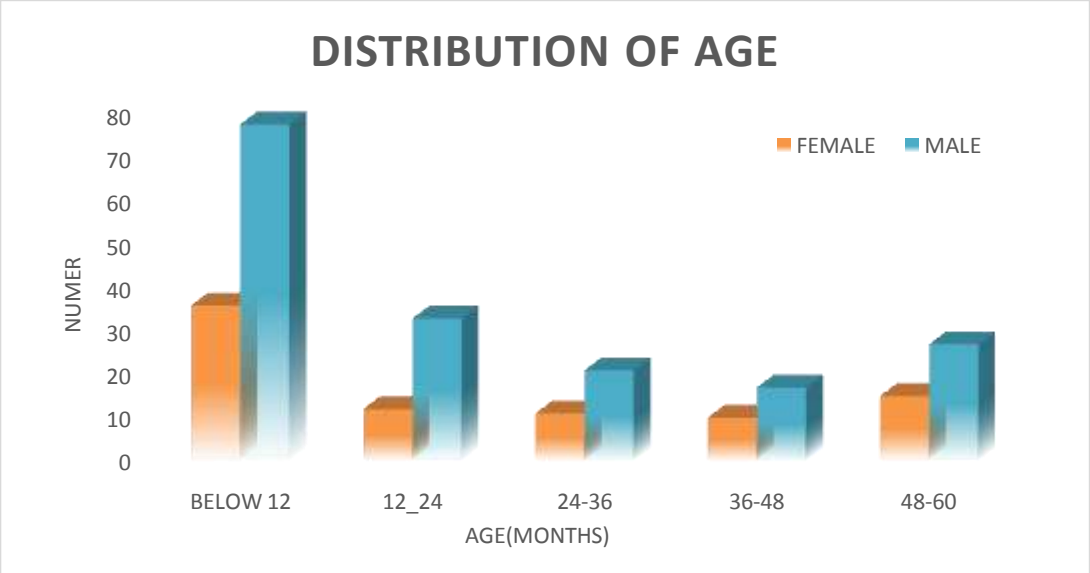
Table no. 1.0: Age (month) and sex wise distribution of study participants

AGE GROUP (MONTH)	FEMALE	MALE	TOTAL
BELOW 12	36	78	114
12_24	12	33	45
24-36	11	21	32
36-48	10	17	27
48-60	15	27	42
TOTAL	84	176	260

Figure no. 1.0: age and sex wise distribution of study participants



Results:From the above, table no 1.0 and figure no 1.0 gives information regarding age wise and sex wise distribution of study participants. Maximum number of cases are below 1 year of age group 114(44%) followed by 2 years of age group 45(17%) and 4 to 5 years of age group 42(16%) and minimum number of cases from the 3-4 years of age group 27(10%) out of 260 cases.

Table no 2.0 sex wise distribution of study population

Sex		
	Frequency	Percent
Female	84	32.3
Male	176	67.7
Total	260	100.0

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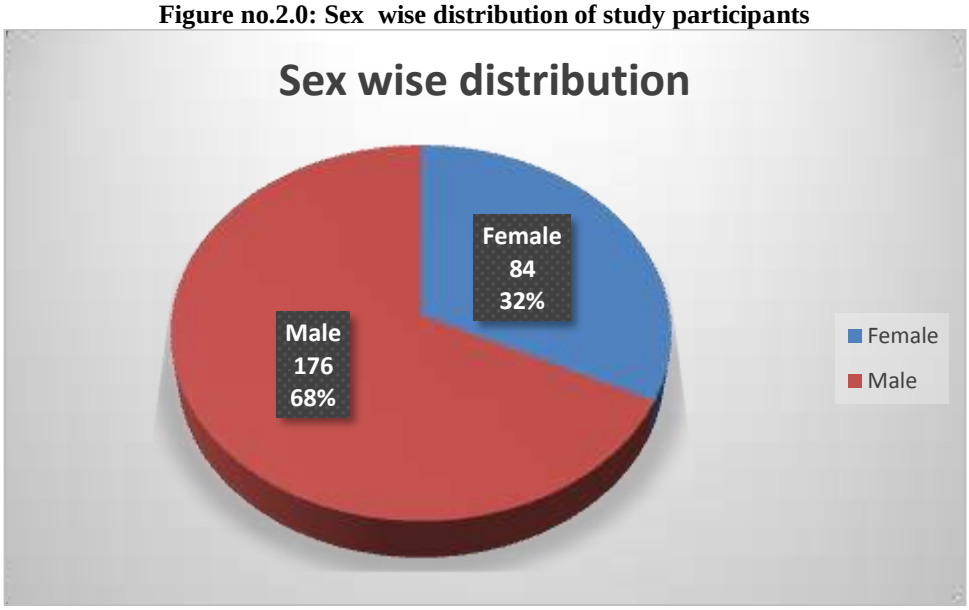
Figure no.2.0: Sex wise distribution of study participants



Results: From the above, table no. 2.0 and pie diagram 2.0 gives information about sex wise distribution of study participants. Maximum number of cases are male, 176 (67.69%) and minimum number of cases are female, 84(32%) out of 260 number of cases.

Table no.3.0 : Ante natal, natal and post natal history

ANTE NATAL			
Smoking	FEMALE	MALE	CHI SQUARE
No	51	111	CHI SQUARE= 0.134, P VALUE= 0.71, NOT SIG
Yes	33	65	
Diet			
No	56	114	CHI SQUARE= 0.09, P VALUE= 0.76, NOT SIG
Yes	28	62	
Infection			
No	70	131	CHI SQUARE= 2.58, P VALUE= 0.019, SIG
Yes	14	45	
NVD/Instrument/LSCS			
No	50	113	CHI SQUARE= 0.53, P VALUE= 0.46, NOT SIG
Yes	34	63	
NICU admission			
No	57	92	CHI SQUARE= 5.6,

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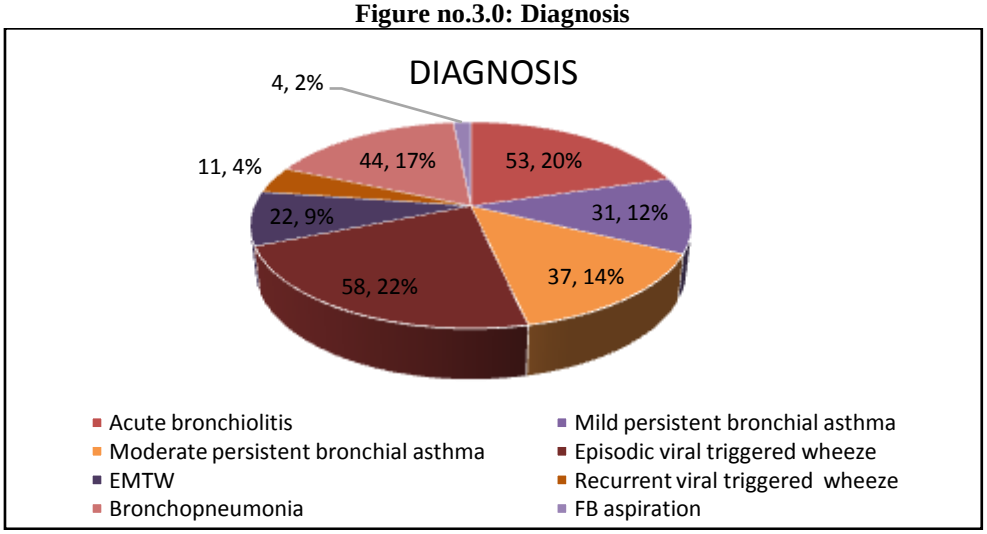
Yes	27	84	P VALUE= 0.01, SIG
Content of weaning			
No	57	131	CHI SQUARE= 1.22, ,P VALUE= 0.26, NOT SIG
Yes	27	45	

Results: From the above, table no 3. 0 gives information about ante natal, natal and post natal history in relation to wheeze. Applying chi square test statistics, there is association between antenatal infections and NICU_admission with wheeze. But the other factors like content of weaning and maternal diet have no association with wheeze.

Table no .4.0: Diagnosis

DIAGNOSIS		
	Frequency	Percent
Acute bronchiolitis	53	20.38
Mild bronchial asthma	31	11.92
Moderate bronchiolitis asthma	37	14.23
Episodic viral triggered wheeze	58	22.30
EMTW	22	8.46
Recurrent viral triggered wheeze	11	4.23
Bronchopneumonia	44	16.92
FB aspiration	4	1.53
Total	260	100.0

Figure no.3.0: Diagnosis



IV. DISCUSSION

In literature, the link between family history and wheezing is well reported. A family history of atopy is a risk factor for all types of wheezing[13] Maternal atopy in particular increase the risk of persistent wheezing.[14] Family studies have demonstrated the genetic contribution to atopy, persistent wheezing and asthma. The familial contribution to transient early wheezing is likely to take the form of congenitally small airway.[14]

In our study, we evaluated various risk factors like atopy, allergy, asthma, eczema and smoking. In our study, 122 children have family history of bronchial asthma, 106 children have family history of atopy, 94 children have family history of eczema., 68 children have family history of migraine . Family history of smoking was present in 38% children;. In our study we found there is significant association between family history of atopy (CHI SQUARE =4.37, P value =0.03) and under 5 wheeze. In a study by **Simon** in 372 US children, 128 (34.4%) experienced transient wheezing and 175 (47.0%) never wheezed. Author found that atopy was associated with transient wheezing,

In our study, average family size was around 6 members. We found no significant difference between wheezers and non-wheezers with respect to number of family members (6 and above) ($p > 0.05$). However, all four children who developed recurrent wheezing had family size of 5 members, indicating that overcrowding is associated with recurrent wheezing.

V. CONCLUSION:

In our study episodic viral triggered wheeze was the commonest cause of wheezing (22.30%) followed by acute bronchiolitis (20.38%) and bronchopneumonia (16.92%) and moderate pesistent bronchial asthma(14.23%).

In our study, the risk factors identified for under five wheezers are male child, children with family history of atopy, ante natal infection, pre term delivery, NICU admission, and overcrowding in the family, similar to observations made in other studies. However we couldn't find maternal smoking as a risk factor in our study due to socio cultural life style in the study population.

Identifying the various risk factors of recurrent wheezing in early childhood is crucial for the success of intervention for improved quality of life in these children.

However further studies are necessary with larger number of children and longer duration of follow up for concurrence of these observations

CONFLICT OF INTEREST

There is no conflict of interest among the authors

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