



P-ISSN: 2664-3685

E-ISSN: 2664-3693

IJPG 2020; 3(2): 93-96

Received: 01-06-2020

Accepted: 08-07-2020

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## Prevalence and risk factors of episodic and multi trigger wheezer in children aged less than five years presenting to rural tertiary care hospital

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**DOI:** <https://doi.org/10.33545/26643685.2020.v3.i2b.102>

### Abstract

**Background:** Wheezing is more common in children less than five years due to small calibre airways and compliance of children lung. In the present study we have studied the prevalence and risk factors of episodic and multi trigger wheezer in children aged less than five years presenting to rural tertiary care hospital at Chidambaram, Tamilnadu.

**Methods:** Children aged 6 months to 60 months presented with wheeze attending Raja muthiah medical college and hospital, Chidambaram from October 2018 to March 2020 were the target population. Children who are all satisfied the inclusion criteria after obtaining ethical and informed parental consent selected as study population. A structured pro forma was used to obtain data which includes epidemiological profile and risk factors of study population.

**Results:** In this study among 119 study population, 76 children were multi trigger wheezer and 43 were episodic wheezer. In multitrigger wheezer group among biological triggering factor children with family history of asthma (14.47%), indoor triggering factor house dust (18.42%) and outdoor triggering factor smoking (28.95%) were the most prevalent risk factor for wheezing in children aged less than five years.

**Conclusion:** In this rural population, multitrigger wheezer are more prevalent than episodic wheezer in children aged less than five years. In this study Outdoor triggering factor smoking is responsible for wheeze in more children aged less than five years.

**Keywords:** Episodic wheezer, multitrigger wheezer, risk factors for wheeze

### Introduction

Wheeze is more common in children less than five years of age. Prevalence of wheeze is higher in first year of life nearly 25 to 30 percent of infants will have minimum one episode of wheezing <sup>[1]</sup>. By 3 years of age 40 percent of children affected by wheeze and by six years of age, 50 percent children will have at least one episode of wheeze <sup>[1]</sup>. Infants are more prone to wheeze when compared to older children, as a result of differing lung mechanics. Both airway size and compliance of the children lung is responsible for airflow obstruction <sup>[2]</sup>. In children younger than 5 year, small-calibre peripheral airways can cause up to 50% of the total airway resistance. Inflammation related to viral infection cause further narrowing of respiratory tract and subsequent wheezing <sup>[2]</sup>. In the present study we have studied the prevalence and risk factors of episodic and multi trigger wheezer in children aged 6 months to 60 months at Chidambaram, Tamilnadu.

### Aim

To find out the prevalence of episodic wheezer and Multi trigger wheezer in children aged 6 months to 5 years.

### Objectives

1. To find out the prevalence of episodic and multi trigger wheezer in children aged 6 months to 60 months.
2. To assess the risk factors associated with episodic and multi trigger wheezer.

### Materials and Methods

Children aged 6 months to 60 months presented with wheeze attending Raja muthiah medical college and hospital, Chidambaram from October 2018 to March 2020 were the

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**Target population.** Children who are all satisfied the inclusion criteria after obtaining ethical and informed parental consent selected as study population. A structured pro forma was used to obtain data which includes epidemiological profile and risk factors of study population.

### Inclusion Criteria

Children in the age group 6 months to 5 years presenting with wheeze on clinical examination.

### Exclusion Criteria

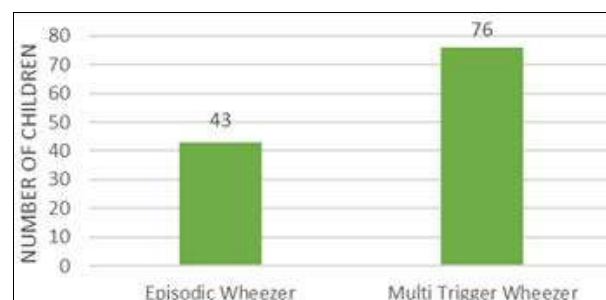
Chronic lung disease, congenital airway and lung anomalies, pulmonary tuberculosis, Immunodeficiency disease.

A structured pro forma was used to obtain data which includes epidemiological profile and risk factors associated with wheeze and then statistically analysed. P value <0.05 was considered statistically significant

### Results

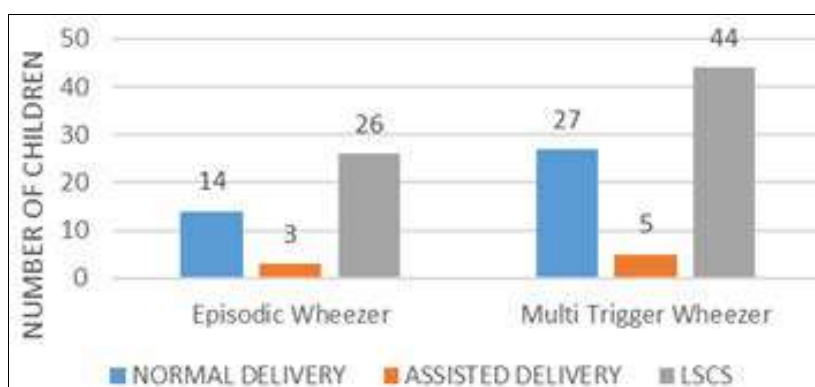
Target population was children presenting with wheeze aged 6 months to 60 months visited to paediatric department at Raja muthiah medical college, Chidambaram from October

2018 to March 2020. Among 187 target population, 119 eligible participants were included in this study as per inclusion criteria.



**Fig 1:** Prevalence of Under Five Wheezer

**Sex:** In episodic wheezer group out of 43 children, 24 (55.8%) were male children and 19 (44.2%) were female children whereas in multi trigger group out of 76 children, 52 (68.42%) were male and 24 (31.58%) were female children. There was no statistically significant difference between male and female children (p value >0.05)



**Fig 2:** Mode of Delivery among Under Five Wheezers

In episodic wheezer group 14 (32.56%) children were delivered by normal vaginal delivery, 3 (6.98%) by assisted delivery and 26 (60.47%) delivered by LSCS delivery,

whereas in multitrigger wheezer group 27(35.53%) children were delivered by normal vaginal delivery, 5 (6.59%) by assisted delivery and 44 (57.89%) were delivered by LSCS.

**Table 1:** Biological and Genetic Triggering Factors among Under Five Wheezers

Biological and Genetic Triggering Factor	Under Five Wheezer	
	Episodic Wheezer	Multi Trigger Wheezer
Nil	43 (100 %)	31 (40.79 %)
Family History of Asthma	0	11 (14.47%)
Excessive Cry/Laugh/Exercise	0	9 (11.84%)
Atopy	0	4 (5.26%)
Eczema	0	4 (5.26%)
Allergens	0	8 (10.53%)
Multiple	0	9 (11.84%)
Total	43 (100%)	76 (100%)

Family history of asthma was significant in wheezer under five years of age when compared with other biological and genetic triggering factors. 11 (14.47 %) children had history of asthma in their family. 9 (11.84 %) were associated with, excessive cry/laugh/exercise due to bronchospasm. 4 (5.26 %) had atopy history, 4 (5.26 %) had eczema history, 8 (10.53 %) had food allergy history and 9 (11.84 %) children had multiple biological triggering factors. (TABLE.1)

**Table 2:** Indoor Triggering Factor among Under Five Wheezers

Indoor Triggering Factor	Under Five Wheezer	
	Episodic Wheezer	Multi Trigger Wheezer
Nil	43 (100%)	38 (50%)
Housedust	0	14 (18.42%)
Indoor Smoking	0	10 (13.16%)
Multiple	0	13 (17.11%)
Pet Animals	0	1 (1.32%)
Total	43 (100%)	76 (100%)

In this study, house dust seemed to be more prevalent indoor triggering factors among multi trigger wheezer. In the above mentioned group 14 (18.42 %) children were affected by house-dust factor, 10 (13.16%) had history of exposure to smoking, 1 child had exposure to pet animals and 13 (17.11

%) children had multiple indoor triggering factor (smoking and house dust -10 children, smoking and pet animals - 2 children and house dust and pet animals -1 children.) (TABLE.2)

**Table 3:** Outdoor Triggering Factors among Under Five Wheezers

Outdoor Triggering Factor	Under Five Wheezer	
	Episodic Wheezer	Multi Trigger Wheezer
Nil	43 (100 %)	24 (31.58 %)
Pollen Grains	0	6 (7.89%)
Outdoor Smoking	0	22 (28.95 %)
Nearby Road Dust -	0	9 (11.84%)
Multiple Factors	0	15 (19.74 %)
Total	43 (100%)	76 (100%)

In this study, Smoking is the most prevalent outdoor triggering factor for wheeze in the children who aged below five years. Among multi trigger wheezer group 22 (28.95%) children had history of exposure to smoking, 9 (11.84%)

with nearby road dust, 6 (7.89%) children with pollen grains as triggering factor and 15 (19.74%) had multiple triggering factors (pollen grains and outdoor smoking - 2 children, outdoor smoking and nearby road dust-13 children) (table.3)

**Table 4:** Nocturnal Cough History among Under Five Wheezers

	Under Five Wheezer		P value
	Episodic Wheezer	Multi Trigger Wheezer	
Children with H/O Nocturnal Cough	33 (76.74 %)	39 (51.32%)	< 0.05
Children Without H/O Nocturnal Cough	10 (23.26 %)	37 (48.68%)	
Total	43 (100%)	76 (100%)	

In this study, majority of the children had history of nocturnal cough.72 children had been identified with the history of nocturnal cough and out of them, 33 (76.74%) were episodic wheezer and 39 (51.32%) were multi trigger wheezer with statistically significant P value < 0.05 (Table. 4)

## Discussion

This observational prospective study was done at rural tertiary care hospital, Raja muthiah medical college and hospital, Chidambaram to know the prevalence and risk factors of episodic and multitrigger wheezer among the study population aged from 6 months to 60 months presenting with wheeze during October 2018 to march 2020 (1 ½ years). Study population in this study was 119 children.

**Prevalence:** In this study out of 119 participant, 43 (36.13 %) children were episodic wheezer and 76 (63.87 %) were multi trigger wheezer. In the medical literature review prevalence studies are not available similar to this study age group.

**Sex:** In this study majority of children were male children (63.9 %) whereas female children were 36.1 %. It shows similar to study done by C.Almqvist *et al.* [3] who observed 66 % male children and 34% female children.

**Mode of Delivery:** In this study 58.8 % children born by lscs, 34.5% by normal vaginal delivery and 6.7% by assisted delivery. It shows similar to study done by Jukka kero *et al.* [7], S. Thavagnanam *et al.* [8], Huang L *et al.* [10], Keagoe *et al.* [11]. Study done by Azad MB *et al* [12] found that difference in gut microbiota in newborn delivered by vaginal delivery decrease the incidence of wheezing whereas study done by J.Juhn *et al.* [9] who observed that no association between

mode of delivery and risk of developing wheeze in children.

**Environmental and Biological Risk Factors:** In this study among biological and genetic risk factors 14.47 % children had family history of wheezing, 11.84 % children had history of wheeze during excessive cry/laugh and exercise. Among indoor triggering factor 18.42 %children had history of allergy to house dust whereas in outdoor triggering factor 18.49 % children had history of allergy to outdoor smoke pollution whereas study done by Takkouche B *et al.* [4], Almqvist C *et al.* [3], Huss K *et al.* [5], Johnson cc *et al.* [15] found that early exposure to pet animal and allergen decrease the incidence of wheezing in children. Study done by Bowatte. G *et al.* [13], Khreis H *et al.* [14] found that children living near main roads are more prone for wheezing.

**Nocturnal Cough:** Similar to study done by Brand P L *et al.* [6] in this study all children in episodic wheezer group had history of cold and 60.5% children had history of nocturnal cough. Among children with nocturnal cough, 27.73% children were episodic wheezer and 32.77% were multi trigger wheezer. In this study history of cold and nocturnal cough among under five wheezer had significant p value (<0.05).

## Conclusion

In this study multitrigger wheezer are more prevalent than episodic wheezer. It has been observed that nocturnal cough is the most prevalent symptom in this study. Children included in the study who are born by caesarean delivery shows that wheezing is more prevalent in above mentioned group than children delivered by normal vaginal delivery and it needs further study to confirm the association.

In this study, children with family history of asthma, house dust (indoor triggering factor) and smoking (outdoor

triggering factor) were the most prevalent risk factors for wheezing in children aged less than five years.

To know the association of risk factors in developing episodic and multitrigger wheeze in children under five years we need more analytical and experimental studies. So that early identification and avoidance of modifiable risk factors may help in reduction of prevalence of wheeze in children aged less than five years.

### Limitations

- Observational study
- The sample size is small.
- It is a hospital based study

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