Wheezing Conditions in Early Childhood: Prevalence and Risk Factors among Preschool Children

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Background: Using current WHO guidelines, antibiotics are over prescribed in children with wheezing and bronchodilators are under utilized[1]. There are, however, number of causes of wheeze and data on prevalence of wheeze and risk factor among preschool children is lacking in Pakistan. **Aim:** To determine the prevalence of wheezing in early childhood and identify various risk factors in pre school children. **Methods:** This study was conducted in the out patient department of the Children's Hospital, Lahore, which is a tertiary center. It is a prospective hospital based study performed on the children with aged 1-59 months with acute respiratory symptoms. The researcher filled a questionnaire and patients were assessed in the asthma clinic. The study period was from 1st Jan to 31st December 2004. **Results:** The prevalence of recent wheeze was 15.8%. It was more common in infants 46.7%. Other risk factors were females 58%, high prevalence with family history of asthma 66%, and other allergic disease like allergic rhinitis 86% eczema 15%, Smoking 73.6% and low level of education 76.6%. With exclusive breastfeeding (33.3%) the prevalence was found to be low. **Conclusion:** The wheezing is a common symptom in early childhood diseases. Risk factors include age 1-12 months, females, family history of asthma and other allergic disorders. Parents' low education, over crowding and exposure to smoke are other important factors. The breast-feeding seems to have a protective role.
Key words: Wheezing condition, early childhood

The wheeze was less frequent in developing than in developed countries[2], but recently increased prevalence has been reported in developing countries as well[3,4]. Acute respiratory infections (ARI) are one of the most common cause of death in children in developing countries. Almost all ARI deaths in young children in developing countries are due to pneumonia. The WHO programme for the Control of Acute Respiratory Infections has focused on the case management of pneumonia in an attempt to reduce mortality from acute lower respiratory infections. The WHO Programme also recognizes that the clinical presentation of wheeze (usually due to either bronchiolitis or asthma) has considerable overlap with that of pneumonia. There is a need to identify children with pneumonia, to ensure that they will receive antibiotic therapy and to identify children with wheeze whose drug treatment should include a bronchodilator. In developing countries, wheeze may be common in children with bacterial pneumonia due to Streptococcus pneumonia or Haemophilus influenza, or in mixed viral-bacterial lower respiratory infections[5].

Wheezing occurs when the airflow from the lungs is obstructed, due to narrowing of the small airways. Infection or an allergic response causes narrowing of the airways by two mechanisms. One contraction of the smooth muscles surrounding the airways in the lung (a bronchospasm): this occurs as a reaction to an infection (as in pneumonia) or as an allergic response (as in asthma). The other mechanism is swelling of the lining of the bronchioles: this occurs in bronchiolitis, a viral infection of the bronchioles that often occurs in epidemics. It usually affects infants.

The main causes of wheezing are bronchiolitis[6], other respiratory infections, and asthma (recurrent wheezing). An inhaled foreign body and tuberculosis nodes compressing a bronchus can also cause localized wheezing in children.

It is not known why there is more wheezing in some geographical areas than in others. The clinical signs of wheezing include, the wheeze sound, prolonged expiratory phase of respiration, effort in breathing out, diminished air entry, chest in drawing (retractions), recurrent cough (especially at night) and hyper inflated chest (as evidenced by large anterior-posterior dimension or hyper resonance)[7].

The etiology of wheezing in preschool children has also received much attention. Although Horward et al. did not classify wheezing episodes according to age of onset; they found an association with family atopy, especially asthma, but not with a large number of environmental and social factors. In contrast, other studies found a close association between early wheezing episodes and maternal smoking[8,9,10,11].

The aim of the present study was to estimate the prevalence of wheezing among preschool children at a community level and to identify possible risk factors, as we are at high risk of ARI (acute respiratory infection) with wheeze.

Method: This study was conducted at the respiratory and asthma clinic of the Children's Hospital & the Institute of Child Health, Lahore from 1st Jan 2004 to 31st December 2004. Standard questionnaires were completed by the researchers based on parental accounts of symptoms in their children. All children fewer than 5 years and over 1 month of age were included in this study. The medical officer evaluated each case and confirmed the presence of wheeze.

The questionnaire aimed to identify and describe wheeze among the children by asking: if the child has ever

had attacks of wheezing, the number of attacks in the past 12 months, whether attacks cause him/her to be short of breath, whether attacks occur when the child has cold, when playing or running or near animals, dust or grass, etc, and whether the father, mother or siblings have ever suffered from asthma, eczema or hay fever. Wheezing was defined for parents as; a high-pitched musical or whistling sound coming from the chest during breathing, not from the throat.

Parents also answered questions about: child's age and sex, educational level of both parents, child's and family history of atopic diseases, feeding method during first 6 months of life, use of kerosene as fuel, overcrowding at home (defined as more than two persons per room), per ownership, and passive smoking at home.

Results:

Out of 5160 preschool children studied, 815 were reported to suffer from wheezing episode, giving a prevalence of wheeze in a study population of 15.8% (Table-I). A higher percentage of girls were affected than the boys (58% girls as compared with 42% boys) with a ratio of 1.38:1. More wheezy children had formula feed during the first six months of life compared to exclusively breast fed children, (66.3% compared to 33.3%) (Table-II). There was strong family history of asthma or other allergic disorders in the wheezing children. The family history of asthma was 66%, allergic rhinitis 86% and eczema was 15%. Wheezy children had a higher percentage of low parental education level (76%), while 22.3% having secondary school or higher levels of education. The exposure to cigarette smoke was higher in wheezy children i.e. 76.6%.

Fig-I Prevalence of wheeze among preschool children (n=5160)

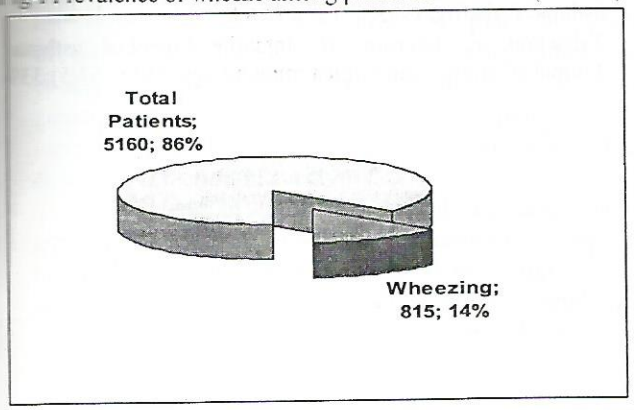

Table-I Age breakdown of wheezing patients (n=815)

Months	n=	%age
0-11	381	46.75
12-23	180	22.09
24-35	68	8.34
36-47	117	14.36
48-59	69	8.47

Fig. 2 Prevalence of wheeze among preschool children

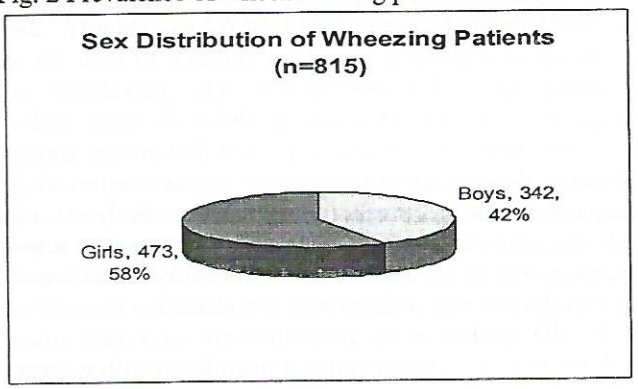

Table-II Prevalence of wheeze among preschool children (n=815)

Family History*	n=	%age
Asthma	539/815	42.0
Allergic Rhinitis	703/815	86.0
Eczema	125/815	15.0
Breastfeeding**		
Exclusively Breastfeed	150	18.40
Not Exclusive Breastfed	300	36.81
Formula Milk	365	44.79
Parental Education		
Low (None/Primary)	625	76.6
High (Secondary/Higher)	190	23.3
Smoke		
Smoke Exposure	600	73.6
No Smoke exposure	215	26.3

** Exclude parents/siblings.*

*** Include children breastfed with supplements or formula fed.*

Table-III Risk factors of Wheezing among preschool children (n=815)

Risk Factors	n=	%age
Siblings:		
1	103	12.6
2	276	33.8
≥3	436	53.4
History in Siblings		
Rhinitis	349	42.8
Wheeze/Asthma	162	19.8
Eczema	50	6.10
None	254	31.1
Parents History of Asthma		
One Parent	196	24.0
Both Parents	50	6.10
None	569	69.8

Discussion:

Pakistan is one of the few countries of the world where ARI is the most common cause of death under 5 year of age, the majority of cases die of bacterial pneumonia. The WHO programs for the case management of pneumonia to reduce the mortality from acute lower respiratory tract infection emphasized that timely diagnosis and treatment can prevent the death. It is identified that signs and symptoms of pneumonia also overlaps with other less

severe conditions e.g. asthma, broncholities etc. in preschool children. Our study was to identify the prevalence of wheeze in preschool children to look for it prevalence and other risk factors. The prevalence of wheeze is somewhat identical to those of other under developed countries. It is also important that history taking and physical examination is important for the diagnosis e.g. pneumonia, asthma, broncholitis and foreign body etc. no doubt the wheeze is a common sign and symptom of acute pneumonia but in a recent multi-central study it was found that two third of the children was not identified by current WHO ARI guidelines so antibiotics are over prescribed and bronchodilators under utilized to children with wheeze.

In our study it is highlighted that children who have family history of asthma are more prompt to wheeze in early age. Overcrowding, parental education is another factor which found to be important and high risk for wheeze, because it is seen in different studies that lower education parents have large families overcrowding and do not guideline for better healthcare. The exclusive breastfeeding has protective role against wheezing while the bottle-feeding has a high risk. Smoking is universally accepted as a contributed factor in the prevalence of the disease and found that children who were exposed to smoke had high prevalence of wheezing.

Conclusion:

In our study we found that the prevalence of wheeze is 15.8%. It is more common in girls as compared to boys and high prevalence with smoking, bottle-feeding and family history of asthma. The breastfeeding has protective role and it is found that the child with wheeze constitute a special ARI group requiring a separate management algorithm in countries where wheeze is common it would be worthwhile for the health worker to use stethoscope to identify the wheeze[1].

References:

1. Assessment and management of children aged 1-59 months presenting with wheeze, fast breathing, and/ or lower chest in drawing; results of a multicentre descriptive study in Pakistan; Archives of Disease in Childhood 2004;89:1049.
2. International Study of Asthma and Allergies in Childhood (ISAAC) Steering Committee. Worldwide variation in prevalence of symptoms of asthma, allergic rhino conjunctivitis, and atopic eczema :ISAAC. Lancet 1998;35:1225-32.
3. Brabin BJ, Kelly Y. Prevalence of childhood asthma in the tropic. Annals of Tropical Paediatrics 1998;18 Suppl:S33-9.
4. Gracey M. Child health in an urbanizing world. Acta Paediatrica 2002;9:1-8.
5. Bronchodilators and other medication s for the treatment of wheeze-associated illness in young children, Programme for the control of Acute Respiratory Infections, WHO, Geneva;WHO/ARI/93.29.
6. Acute Respiratory Infections in Children: Case Management in Small Hospitals in Developing Countries; Ministry of Health, Government of Pakistan, Federal ARI Cell, Children's Hospital, PIMS, Islamabad in collaboration with WHO and UNICEF, Pakistan, WHO/ARI/90.5;1991.
7. Acute Respiratory Infections in Children: Case Management in Small Hospitals in Developing Countries; Ministry of Health, Government of Pakistan, Federal ARI Cell, Children's Hospital, PIMS, Islamabad in collaboration with WHO and UNICEF, Pakistan, WHO/ARI/90.5;1991:3.3.
8. Martinez ED et al. Asthma and wheezing in the first six years of life. The Group Health Medical Associates. New England journal of medicine, 1995, 332(3):133-8.
9. Chan-Yeung M et al. A randomized controlled study on the effectiveness of a multifacetec intervention program in the primary prevention of asthma in high-risk infants. Archives of pediatrics and adolescent medicine, 2000, 154:657-63.
10. Horwood LT, Fergusson DM, Shannon FT. Social and familial factors in the development of early childhood asthma. Pediatris, 1985, 75(5):859-68.
11. Tabachnik E, Levision H. Infantile bronchial asthma. Journal of allergy and clinica immunology, 1981, 67(5):339