# Wheezing - Associated Lower Respiratory Infections in Under 5-Year-Old Children : Study in Takhli District Hospital

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**Abstract**

Wheezing was detected in 251 of the 421 (59.6%) children under 5 years old suffering from acute lower respiratory infections (LRI) treated at the Takhli Hospital, Nakhon Sawan Province from November 1998 to October 2000. Bronchitis and pneumonia accounted for 55.0 per cent and 40.6 per cent of LRI with wheezing. Most of the patients, 162 of 251 (64.5%) cases were children under 2 years old. The wheezing symptom declined significantly in children older than 4 years of age. In this study, LRI with wheezing was found all year round but was more frequent in the rainy season similar to other respiratory infections. As the respiratory syncytial virus (RSV) infections were mainly found during the rainy season (July-October), the association of wheezing and RSV infections in the rainy season was evaluated. RSV causing LRI with wheezing in the rainy season revealed 54.7 per cent and 39.4 per cent in the first and second studied year, respectively. The two-year follow-up of 121 cases of LRI with wheezing showed that 37 cases (30.5%) had repeated episodes of wheezing.

In conclusion, LRI with wheezing caused by RSV was commonly found in children under 2 years old. The occurrence was all the year round but predominantly in the rainy season.

**Key word :** Wheezing, Lower Respiratory Infection, RSV

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Lower respiratory tract infection (LRI) is one of the major problems in infants under 5 years of age causing both high mortality and morbility. Wheezing associated LRI was reported in infant who suffered from various viral infections i.e. respiratory syncytial virus (RSV), influenza, parainfluenza and adenovirus, Bacterial pathogens such as Streptococcus pneumoniae, Hemophilus influenzae, Chlamydial pneumoniae and Mycoplasma infections also caused wheezing both in infants with and without preexisting asthma[1]. Martinez from Tucson reported that wheezing in infants and demonstrated that up to 34 per cent of infants experienced at least one wheezing episode by the age of three years whereas 49 per cent had the same problem by the age of 6 years[2]. However, the percentage of infants with wheezing by the first 6 years of life who developed asthma varied among the studies, some have very a high prevalence of up to 50 per cent[3]. The risk factor of developing asthma is not well understood. The authors, therefore, analyzed the incidence of wheezing associated LRI in young children at Takhli Hospital during on epidemiologic study of RSV-LRI infection in order to determine the epidemiology of LRI with wheezing and wheezing associated RSV-LRI.

## SUBJECTS AND METHOD

The medical history of 421 patients aged under 5 years suffering from acute LRI were collected and analyzed. All attended Takhli Hospital, Nakhon Sawan Province for the cohort study of "Epidemiology of RSV-LRI" from November 1998 to October 2000. This study was conducted with the collaboration of 4 research groups and supported by WHO.

The first group consisted of physicians, laboratory technicians and nurses of Takhli Hospital. They were responsible for the diagnosis and management of the patients, collection of nasopharyngeal specimens, collection of reports and sending the results to the secretariat group.

The second group from Ramathibodi Hospital was responsible for the overall project management, coordination and control utilization of the budget.

The third group consisted of physicians and nurses from the acute respiratory infection (ARI) section, Tuberculosis Division. They were responsible for the training of health care workers in ARI case management, supervision and follow-up of the activities in the province.

The fourth group from Siriraj Hospital was responsible for identifying RSV as the etiologic agent by immunofluorescence staining from the nasopharyngeal specimens collected by local personnel.

All patients who came directly to Takhli Hospital or were referred by the subdistrict health care workers were examined by the same pediatrician throughout the study. LRI was diagnosed clinically, using the WHO module on management of the young child with an ARI (1990). Nurses, laboratory technicians and subdistrict health care workers were screened to ensure appropriate standards. All patients who presented with LRI and wheezing were followed-up for 2 years in order to determine recurrent episodes of wheezing.

### Statistical analysis

Descriptive statistics were used in the analysis with SPSS software.

## RESULTS

There were 421 cases with LRI of which 185 (43.9%) were bronchitis, 213 (50.6%), were pneumonia, 16 (3.8%) were croup and 7 (1.7%) were bronchiolitis. Two hundred and fifty one of these 421 (59.6%) cases with LRI had associated wheezing.

Bronchitis and pneumonia accounted for 55.0 per cent and 40.6 per cent of the LRI with wheezing, respectively (Table 1). Most of the patients, 64.5 per cent (162/251) of the LRI with wheezing were under 2 years old. The wheezing declined significantly in children older than 4 years of age (Table 2).

LRI as well as LRI with wheezing occurred all the year round and the incidence was high in the rainy season (July-October) (Fig. 1). As the RSV infection in this study was found only during the rainy season, LRI with wheezing caused by RSV in the same period were analyzed. In the first studied year (1998 -1999), 35 of 64 (54.7%) of LRI with wheezing was caused by RSV and in the second year (1999-2000), 28 of 71 (39.4%) of LRI with wheezing was caused by RSV. Therefore in other seasons, LRI with wheezing may be caused by other viruses, bacteria or other conditions.

**Table 1. Clinical diagnosis of LRI with wheezing.**

| Clinical diagnosis | Number | % |
|---|---|---|
| Bronchitis | 138 | 54.9 |
| Pneumonia | 102 | 40.6 |
| Bronchiolitis | 7 | 2.8 |
| Croup | 4 | 1.6 |
| Total | 251 | 100 |

**Table 2. Age group of LRI with wheezing.**

| Age (month) | Number | % |
|---|---|---|
| < 12 | 82 | 32.6 |
| 13-24 | 80 | 31.9 |
| 25-36 | 43 | 17.1 |
| 37-48 | 34 | 13.5 |
| 49-60 | 12 | 4.8 |
| Total | 251 | 100 |

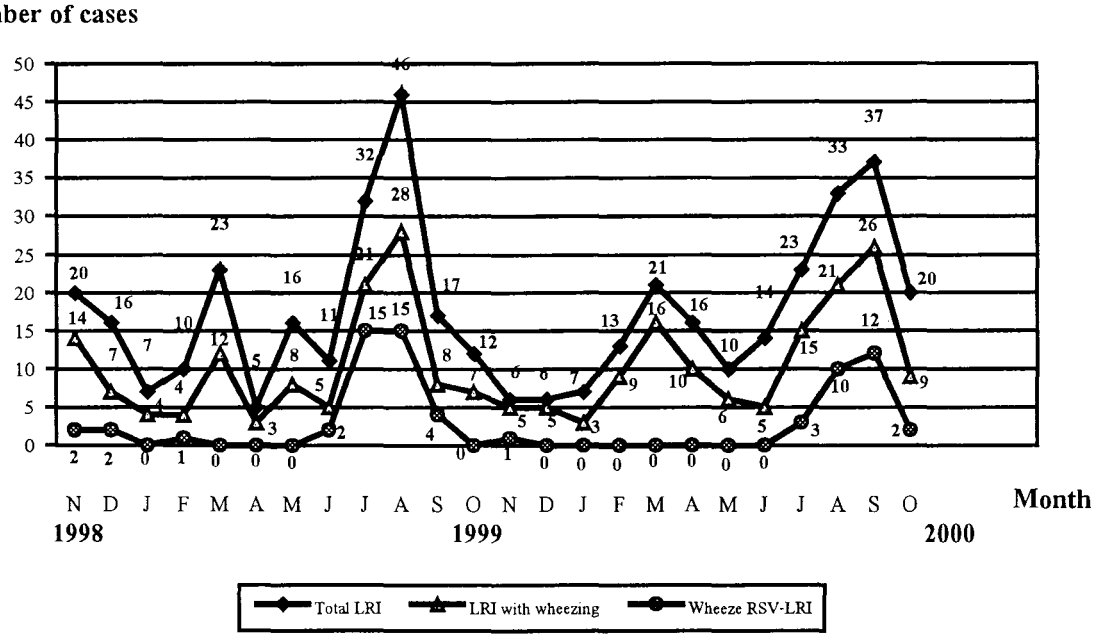


**Fig. 1. Seasonality of LRI with wheezing.**

After a 2 year follow-up of 121 cases of LRI with wheezing, thirty seven cases (30.5%) had recurrent episodes of wheezing. Eleven cases were caused by RSV while 26 cases were non RSV.

## DISCUSSION

Several studies have shown an increased frequency of wheezing in children after severe RSV-associated lower respiratory tract infections. The study from Gambia showed that wheezing was identified in 39 per cent of inpatients and 75 per cent of outpatients with RSV infections[4]. Studies in Thailand between 1988 and 1990 demonstrated that 17-20 per cent of LRI were caused by RSV[5,6] and 45 per cent of RSV pneumonia had wheezing[7]. Another study showed that 12 per cent of LRI had associated wheezing of which, after 2 year follow-up, almost one third developed repeated episodes of wheezing and were diagnosed as having asthma[8].

In the present study, LRI with wheezing increased almost 5 times from that of the previous study in 1987. The occurrence was all the year round

but more frequent during the rainy season similar to other lower respiratory infections. In the first studied year, 54.7 per cent of LRI with wheezing in the rainy season was caused by RSV, and 39.4 per cent in the second year; while 64 per cent of the total LRI were caused by RSV in the first year and 37 per cent in the second year[9].

After a 2 year follow-up, only one-third (30.5%) of the children who developed a repeated episode of wheezing were in the RSV positive group comparable to a previous report from Ramathibodi Hospital[10] and by Sigurs et al[11].

LRI with wheezing in the present study was commonly found in children under 2 years old and significantly declined after 4 years old. This trend may relate to physiologically narrow airways of small children which gradually improve with time.

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# โรคติดเชื้อระบบหายใจส่วนล่างที่มีเสียงหวีดร่วมด้วย ในเด็กอายุต่ำกว่า 5 ปี ในโรงพยาบาลชุมชนตาคลี

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ในการศึกษาระบาดวิทยาของ lower respiratory infections (LRI) with wheezing ที่โรงพยาบาลชุมชนตาคลี จังหวัดนครสวรรค์ ระหว่างเดือนพฤศจิกายน 2541 ถึงเดือนตุลาคม 2543 แบบ prospective study พบว่า มีผู้ป่วยเด็กอายุต่ำกว่า 5 ปี จำนวน 251 ราย จาก 421 ราย ที่เป็น LRI มี wheezing ร่วมด้วย คิดเป็นร้อยละ 59.6 ผู้ป่วยส่วนใหญ่ได้รับการวินิจฉัยโรค bronchitis ร้อยละ 55.0 และ pneumonia ร้อยละ 40.6 ผู้ป่วย 162 ราย (ร้อยละ 64.5) เป็นเด็กอายุต่ำกว่า 2 ปี และพบอาการ wheezing น้อยลงมากเมื่ออายุมากกว่า 4 ปี ในการศึกษานี้ พบ LRI with wheezing ได้ตลอดปี แต่ RSV infection พบเฉพาะฤดูฝน จึงได้วิเคราะห์หาสาเหตุของ LRI with wheezing ในฤดูฝนพบว่าร้อยละ 54.7% เกิดจาก RSV ในปีแรก และร้อยละ 39.4 ในปีที่สองของการศึกษา ในการติดตามผู้ป่วยที่มีอาการ LRI with wheezing เป็นเวลา 2 ปี พบว่าผู้ป่วย 37 ราย คิดเป็นร้อยละ 30.5 เกิดอาการ LRI with wheezing ซ้ำ กล่าวโดยสรุป LRI with wheezing พบบ่อยมากในเด็กอายุต่ำกว่า 2 ปี เมื่ออายุมากขึ้นจะพบน้อยลงและพบได้ตลอดปี พบมากช่วงฤดูฝน ซึ่งส่วนใหญ่เกิดจาก RSV

**คำสำคัญ** : เสียงหวีด, โรคติดเชื้อทางเดินหายใจส่วนล่าง, RSV

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