Childhood Asthma : Proper Managements do Reduce Severity

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Abstract

Rationale : Asthma is an increasing problem, both in children and adults which is due to an increase in environmental pollution. The current management of asthmatic patients is different from the previous decade as more understanding of the mechanism of asthma pathology is known.

Objectives : To study the prevalence of hospitalized asthmatic patients of different age groups in the past decade and to compare the results of different treatments during each 5-year period, 1986-1990, 1991-1995 and 1997-2001.

Material and Method : A retrospective review of the Out-patient Department (OPD) and In-patient Department (IPD) cases of asthma patients, sorted by International Classification of Diseases (ICD 9 & 10) at the Queen Sirikit National Institute of Child Health (QSNICH), previously known as Children's Hospital was carried out. The patients were divided into 3 groups according to the 5-year period of admissions : 1986-1990, 1991-1995 and 1997-2001. Comparison of the prevalence, age distribution, management, severity and outcomes of the patients in different groups using the standard statistical package SPSS for windows.

Results : The prevalence of asthma increased from 7,476 OPD visits in 1986 to the peak of 15,576 visits in 1997 and about 13,000-14,000 stable visits from1998 through 2001. About 2-3 per cent of these OPD cases were admitted to the hospital. After the hospital charts had been reviewed, 2,927 cases of true asthma cases (81.9%) were studied and they were divided into 3 groups, group 1, 2 and 3 consisting of 1,140; 716 and 1,071 patients, respectively. About 60-80 per cent of the admitted cases were children under 5 years old. With the different management of hospitalized cases between the 3 periods, a significant reduction in the readmission rate was outstanding from 14 per cent to 5 per cent and the maximum number of readmissions was reduced from 8 times to 5 times (the majority was 2 times). The length of stay and the percentage of complicated respiratory failure cases were not different.

Conclusion : The asthma prevalence is increasing. Young children 0-2 years of age tend to have more severe diseases that need hospitalization. Current management, inhaled beta 2 agonists,

together with anti-inflammatory drugs do reduce asthma severity to a certain degree. Early intervention of controller medications and regular follow-up care do reduce the readmissions. Further newer treatment of asthma is required for better outcomes of these asthmatic patients.

Key word : Childhood Asthma, Younger Age Group, Proper Management, Severity, Readmissions

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J Med Assoc Thai 2003; 86 (Suppl 3): S648-S655

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Asthma is one of the most common chronic diseases worldwide with a significant impact on individuals, families and the whole society. The prevalence of asthma among children and adults, including hospitalizations and deaths is increasing[1-15]. In Thailand, the prevalence of asthma in the school age group increased from 4.29 per cent in 1986[16] to 13 per cent in 1996[17]. The incidence increased in under five year old children which is likely correlated with the increase in environmental pollution[18]. Understanding the mechanisms involved in asthma, the management is directed towards airway inflammation in addition to the relief of bronchospasm. Anti-inflammatory drugs as well as bronchodilators play an important role in the control of asthma. Well-controlled asthma decreases hospitalization and improves the quality of life of asthmatic patients[19-21].

At the Queen Sirikit National Institute of Child Health (QSNICH), previously known as Children's Hospital, there has also been a trend of an increasing number of asthmatic patients, both in the Out-Patient Department (OPD) and In-Patient Department (IPD)[18]. Management of asthma has gradually changed over the years from subcutaneous adrenaline/beta-2 agonists, intravenous aminophylline and systemic corticosteroids to inhaled beta-2 agonists and inhaled steroids with more emphasis on prophylactic medications and good rehabilitation.

Objectives

To study the prevalence of asthma in different age groups in the past decade and to compare the results of different treatments during each 5-year period, 1986-1990, 1991-1995 and 1997-2001.

MATERIAL AND METHOD

A retrospective review of OPD and IPD patients at the QSNICH (Children's Hospital) between 1986-2001, by sorting cases with the diagnosis of asthma, R/O asthma, asthmatic bronchitis by International Classification of Disease (ICD) 9 and ICD 10. Hospitalized patients' charts with those diagnoses were reviewed and re-classified as true asthma if they met the following criterias :

o Recurrent wheezing ≥ 3 times and/or

o Good response to rapid acting bronchodilators (nebulized beta-2 agonist or subcutaneous adrenaline)

The severity of the disease measured by 3 parameters : length of stay, number of readmissions and the need for ventilatory support and ICU care.

The patients were divided into 3 groups according to the period of admission as follows:

Group 1 - patients admitted between 1986-1990.

Group 2 - patients admitted between 1991-1995.

Group 3 - patients admitted between 1997-2001.

Statistical analysis was done by using the standard statistical package SPSS for windows.

RESULTS

Prevalence

The number of OPD visits of asthmatic patients started from 7,476 visits in 1986 and reached the peak of 15,576 visits in 1997 and remained more stable at about 13,000-14,000 visits from 1998 through 2001 (Fig. 1).

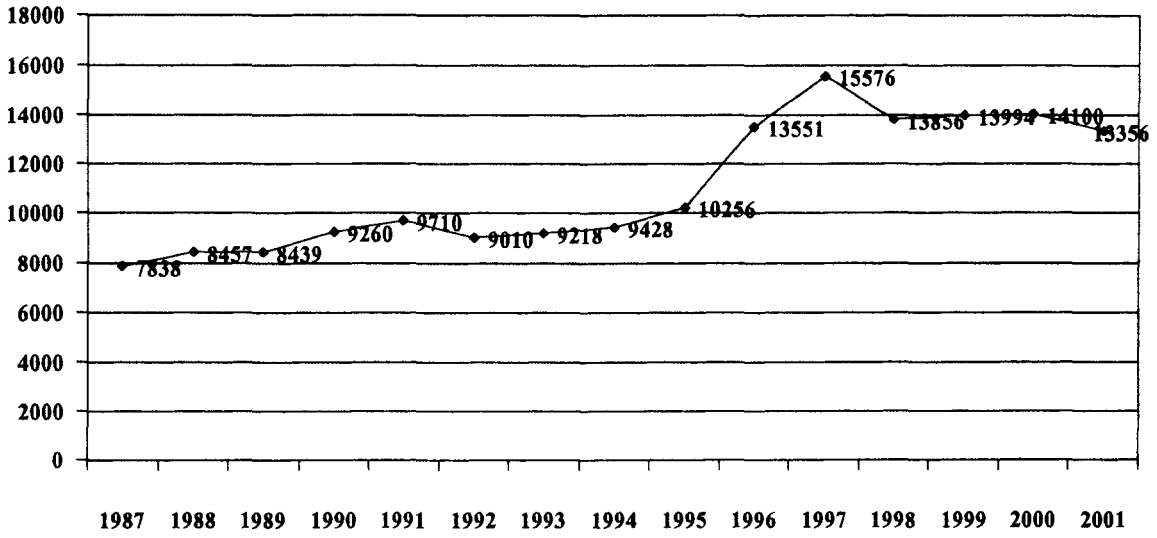

Fig. 1. Number of OPD visits of asthmatic patients 1986-2001.

The number of IPD cases decreased from 386 cases in 1986 to 141 cases in 1995, and increased afterwards corresponding with the OPD visits (Fig. 2).

The total number of asthma admission charts available for review was 3,576 charts (89.7%). Among these reviews, 2,927 cases were true asthma cases (81.9%).

There were 1,140, 716 and 1,071 admissions in group 1, 2 and 3 respectively. The male to female ratio of patients in group 1, 2 and 3 was 1.21 : 1, 1.48 : 1 and 1.7 : 1, respectively.

Age distribution

About 60-80 per cent of the admitted cases were children under 5 years old, while 15-25 per cent were children between 5-10 years old. Older children > 10-15 years of age were admitted about 4-10 per cent (Table 1).

Age-adjusted admission rate, positive family history and environment

The age-adjusted admission rate significantly decreased from 4 per cent in group 1 to 2.1 per cent and 1.94 per cent in group 2 and 3. The allergic diseases in the families were found to be 55.2 per cent, 60.8 per cent and 65.6 per cent respectively. The environmental factors, include pets, nearby factories, main roads, road and building construction and cigarette smoking, were significantly increased, 12 per cent in group 1, 32 per cent in group 2 and 54.2 per cent in group 3 (Table 2).

Management

Nebulized beta-2 agonist was introduced in early 1989, so in group 1 the use of nebulized beta 2 agonist was 31.4 per cent which is less than group 2 (95.5%) and group 3 (97.0%). Intravenous aminophylline was used between 60-70 per cent in all 3 groups of patients while systemic steroids were used significantly more, 18.1 per cent in group 1, 29.4 per cent in group 2 and 58.6 per cent in group 3, respectively. Antibiotics were used between 14-20 per cent in all groups of patients (Table 3).

Outcomes

The average length of stay (3.3-3.6 days) and the percentage of respiratory failure cases (0.4-1.1%) were not different between these 3 groups of patients, but the readmission rate was significantly

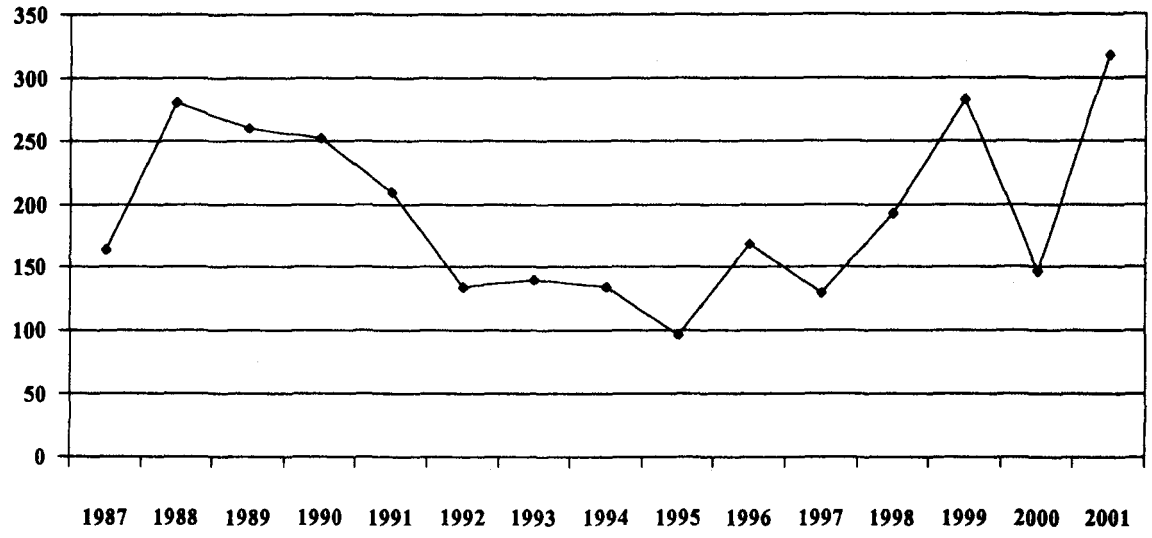

Fig. 2. Number of IPD admissions of asthmatic patients 1986-2001.

Table 1. Age distribution of the admitted patients of the 3 groups.

Age range (years)	Group 1 (%)	Group 2 (%)	Group 3 (%)	P-value
0-2	21.9	23.6	34.5	0.003
> 2-5	42.4	46.4	47.0	0.302
> 5-10	25.8	22.7	14.8	0.003
> 10	9.9	7.4	3.8	0.001

Table 2. Age-adjusted admission rate, family history of allergic diseases and environment positive of asthmatic patients of the 3 groups.

	Group 1 (%)	Group 2 (%)	Group 3 (%)	P-value
Age-adjusted of admission	4.0	2.1	1.9	0.002
Family history positive	55.2	60.8	65.6	0.028
Environment positive	12.0	32.0	54.2	0.000

lower in group 3 (5%) than group 2 (9.9%) and group 1(14.6%) (Table 4, 5). Most of these patients had 2 admissions and the maximum admissions in one year was 8 times in group 1 patient while in group 2 and group 3, the maximum readmissions was only 5 times in one year (Fig. 3).

DISCUSSION

The present study revealed an increase in the trend of asthma prevalence in children as previously reported[18]. This correlated very well with the increased percentage of environmental pollution. The OPD visits of asthma patients have increased over

Table 3. Comparison of asthma management of the 3 groups.

Management	Group 1 (%)	Group 2 (%)	Group 3 (%)	P-value
Nebulized beta 2 agonist	31.4	95.5	97.0	0.002
IV aminophylline	72.5	64.6	66.8	0.272
Systemic steroid	18.1	29.4	58.6	0.000
Antibiotics	14.1	16.6	20.4	0.139

Table 4 Outcomes of the admitted asthmatic patients.

Management	Group 1	Group 2	Group 3	P-value
Length of stay (days)	3.5	3.3	3.6	0.667
% Respiratory failure/ICU	1.1	0.6	0.4	0.594
Readmission rate	14.3	9.5	5.2	0.015

Table 5. Number of readmissions of the 3 groups.

Number of admissions	Group 1 n = 1,140	%	Group 2 n = 716	%	Group 3 n = 1,071	%
2	110	9.7	50	7.0	38	3.6
3	29	2.5	13	1.8	12	1.1
4	15	1.3	4	0.6	3	0.3
5	5	0.4	3	0.4	1	0.1
6	5	0.4	0	0	0	0
7	1	0.1	0	0	0	0
8	1	0.1	0	0	0	0
Total	166	14.6	71	9.9	54	5.0

the past decade and are more stable in this present decade at about 13,000-14,000 visits per year. Younger patients, 0-2 years old tend to have more severe diseases as shown by the increase in percentage of admissions from 22 per cent to 24 per cent and 35 per cent. The increase in hospitalization may be due to the increased number of cases because of early allergic sensitization and poor compliance of prophylactic drugs used at home compared to older children. The older children, aged > 5-10 and > 10 years old, were observed to have less severe disease requiring fewer hospitalizations. The increased use of prophylactic drugs such as inhaled steroids in these patients may be part of this decrease in severity[19-23]. Together with easier drug administration of inhaled medication by metered dose or dry powder inhalers in older children and nebulization or metered dose inhalers with spacers in young children. Patients, aged > 2-5 years, showed no significant changes in the percentage of hospitalization.

Although the number of IPD cases increased in group 3, compared to group 2, the age-adjusted percentage of admission was not different between the two groups (2.1% *vs* 1.9%). The positive allergic diseases in the families and environmental factors were significantly increased, similar to other studies[24-32].

The major changes in management of acute asthmatic attacks between these 3 periods of study are as follows :

1986-1990 : Subcutaneous adrenaline and systemic beta-2 agonists were the 2 major therapeutic drugs used. Inhaled beta- 2 agonist was introduced in 1989. Systemic steroids were used in only 18.1 per cent.

1991-1995 : Inhaled beta-2 agonists (95.5%) and increased use of systemic steroids (29.4%).

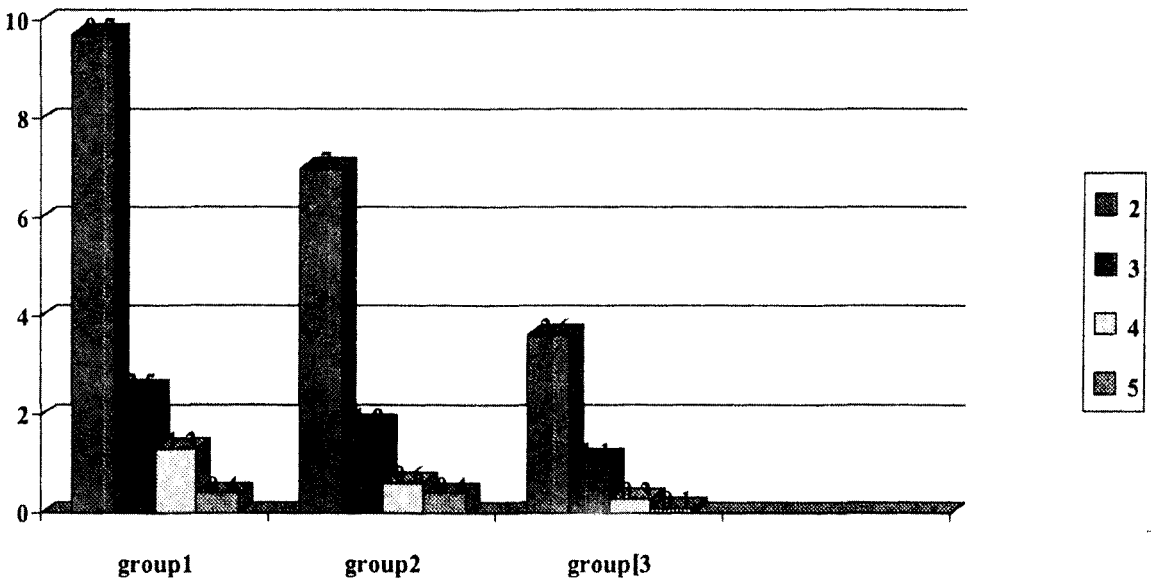

Fig. 3. Number of readmissions (%) in Group 1, 2, 3.

1997-2001 : Inhaled beta-2 agonists (97%) and systemic steroids (58.6%).

The use of intravenous aminophylline and antibiotics was not different between these 3 periods. In addition to the difference in management of acute asthmatic attacks, the OPD management of asthmatic patients was also different. Inhaled steroids as prophylactic drugs were introduced between 1994-1995. Later, more potent inhaled steroids, long-acting beta-2 agonists and anti-leukotrienes are used.

With these significant changes in the management of asthma between the 3 periods at QSNICH, the rate of readmission of asthmatic patients markedly declined from 14 per cent in 1986-1990 to 9 per cent in 1991-1995 and only 4 per cent in 1997-2001 and the maximum number of readmissions had reduced from 8 times per year to 5 times per year. This decrease reflects better outcomes, good long-term management and regular follow-up care.

The length of stay (3.5, 3.3 and 3.6 days) and the percentage of respiratory failure cases (11, 0.6 and 0.4%) of acute asthmatic patients were not affected by the differences in management of these 3 periods. Better management is needed to further reduce the severity and complications of respiratory failure. Education of patients and their families may be important factors to reduce these respiratory failure cases because they often present to the hospital very late after the symptoms of an asthmatic attack.

(Received for publication on July 7, 2003)

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โรคหอบหืดในเด็ก : การรักษาที่ถูกต้องเหมาะสมลดความรุนแรงของโรคได้

*มุกดา หวังวีรวงศ์, พบ**

ความเป็นมา : โรคหอบหืดเป็นโรคที่มีปัญหาเพิ่มขึ้นทั้งในเด็กและผู้ใหญ่ ซึ่งมีความสัมพันธ์กับสิ่งแวดล้อม ความรู้ความเข้าใจทางด้านพยาธิสภาพของโรคที่เพิ่มขึ้นทำให้ การรักษาโรคหอบหืดในปัจจุบันแตกต่างจากทศวรรษที่แล้ว

วัตถุประสงค์ : ศึกษาหาอุบัติการณ์ของผู้ป่วยเด็กโรคหอบหืดในแต่ละช่วงอายุที่รับรักษาในโรงพยาบาล และศึกษาเปรียบเทียบผลของการรักษาต่อความรุนแรงของโรคในช่วงระยะเวลา 15 ปี โดยแบ่งเป็น 3 กลุ่ม ๆ ละ 5 ปี

วิธีการศึกษา : ศึกษาย้อนหลังสถิติผู้ป่วยเด็กโรคหอบหืดตาม ICD 9-10 ที่แผนกผู้ป่วยนอกและผู้ป่วยในของสถาบันสุขภาพเด็กแห่งชาติมหาราชินี โดยแบ่งเป็น 3 กลุ่ม กลุ่มที่ 1 ช่วงปี พ.ศ. 2529-2533 กลุ่มที่ 2 พ.ศ. 2534-3538 กลุ่มที่ 3 พ.ศ. 2540-2544 คัดเฉพาะผู้ป่วยที่เป็นโรคหอบหืดจริง ศึกษาเปรียบเทียบหาอุบัติการณ์ในแต่ละช่วงอายุ การรักษาและความรุนแรงของโรคของทั้ง 3 กลุ่ม

ผลการศึกษา : อุบัติการณ์ของโรคหอบหืดของผู้ป่วยนอกเพิ่มขึ้นอย่างมากจาก 7,476 ราย ในปี พ.ศ. 2529 สูงสุด 15,576 รายในปี พ.ศ. 2540 ผู้ป่วยที่รับรักษาในโรงพยาบาลเป็นผู้ป่วยโรคหอบหืดจริง 2,927 ราย คิดเป็นร้อยละ 81.9 ผู้ป่วยในกลุ่มที่ 1 มีจำนวน 1,140 ราย กลุ่มที่ 2 มี 716 ราย และกลุ่มที่ 3 มี 1,017 ราย ตามลำดับ ร้อยละ 60-80 ของผู้ป่วยที่รับรักษาในโรงพยาบาล เป็นเด็กอายุน้อยกว่า 5 ปี พบว่าผลการรักษาที่ต่างกันของทั้ง 3 กลุ่มทำให้อัตราการรับผู้ป่วยซ้ำในโรงพยาบาลลดลงอย่างมีนัยสำคัญทางสถิติ จากร้อยละ 14 เป็นร้อยละ 5 และจำนวนครั้งที่รับผู้ป่วยซ้ำในโรงพยาบาลลดลงจาก 8 ครั้งต่อปีเป็น 5 ครั้งต่อปี จำนวนวันที่รับรักษาในโรงพยาบาล และอัตราการเกิดโรคระบบหายใจล้มเหลวและรับผู้ป่วยในห้อง ICU ไม่แตกต่างกันในทั้ง 3 กลุ่ม

สรุป : อุบัติการณ์ของโรคหอบหืดในเด็กเพิ่มมากขึ้นทุกปี ผู้ป่วยกลุ่มอายุ 0-2 ปี ที่ต้องรับรักษาในโรงพยาบาลมีจำนวนมากกว่าในกลุ่มอายุอื่น การรักษาในปัจจุบันด้วยยาพ่นขยายหลอดลม และยาในกลุ่มต้านการอักเสบมีผลทำให้ความรุนแรงของโรคลดลง การพิจารณาให้ยาควบคุมโรคเร็วขึ้นร่วมกับการมาพบแพทย์อย่างสม่ำเสมอทำให้อัตราการรับผู้ป่วยซ้ำในโรงพยาบาลลดลง

คำสำคัญ : โรคหอบหืดในเด็ก, ผู้ป่วยอายุน้อย, การรักษาเหมาะสม, ความรุนแรงของโรค, การรับรักษาซ้ำในโรงพยาบาล

มุกดา หวังวีรวงศ์
จดหมายเหตุทางแพทย์ ฯ 2546; 86 (ฉบับพิเศษ 3): S648-S655

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