

## Review Article

# Present status of asthma management in Japan

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### ABSTRACT

The prevalence of asthma has been increasing in Japan, like in other parts of the world. Asthma management guidelines were developed in Japan in 1993 and 1998. These guidelines have been shown to contribute to the improvement of asthma management in Japan. Most allergists know the guidelines and make use of them. However, only half the non-specialists surveyed knew the guidelines in 1996–97, although the awareness of the guidelines increased over the next 3 years. Further efforts are required to implement the guidelines widely.

**Key words:** asthma, epidemiology, management guidelines.

### INTRODUCTION

Around the end of the 1980s, many committees and conferences met to develop guidelines for the management of asthma. All were responding to the realization that the prevalence and morbidity of asthma had been increasing in most parts of the world and that deaths from asthma had increased in some countries but had not decreased in most countries. More importantly, asthma has been recognized as a chronic inflammatory disease of the airway instead of a lung disease with transient episodes of bronchoconstriction. As in other parts of the world, in Japan two asthma management guidelines were published in 1993 and 1998.<sup>1–12</sup>

Reed<sup>13</sup> described the changes of the management of asthma as follows:

‘Revolutionary’ is not too strong a term to describe the change in the understanding of the nature of asthma and its pathogenesis. ‘Revolutionary’ is also appropriate to describe the recent change in the philosophy of treatment, which comes partly from better understanding of the biology of asthma and partly from behavioral science, which places emphasis not on the process of some arbitrary regime, but on the outcome, controlling the disease, and which places the primary responsibility for achieving this control with the patient. With these changes, the physician’s task is not only to diagnose the disease and its severity, to identify the provoking factors and to recommend treatment but, equally important, to teach the patient how to control the symptoms, prevent acute episodes, be physically active and lead a normal life.

In Japan, around the middle of 1980s, airway inflammation of asthma patients attracted the interest of researchers in this field. It has long been known that the airway of asthma patients has characteristic infiltration of eosinophils and round mononuclear cells. Although the role of the eosinophils is not conclusively established, eosinophils have been shown to be proinflammatory cells in the airway of asthma patients and mononuclear T helper (Th) 2 lymphocytes upregulate the functions of eosinophils.<sup>14</sup> This airway inflammation induces persistent airway narrowing due to airway remodeling.<sup>15,16</sup>

The present review is intended to show: (i) the epidemiology of asthma; (ii) the outline of the Asthma Prevention and Management Guidelines 1998; (iii) recognition and utilization of the guidelines; and (iv) the effects of the guidelines.

### EPIDEMIOLOGY OF ASTHMA IN JAPAN

Asthma is one of the most common chronic diseases worldwide and its prevalence is increasing in children.<sup>17,18</sup> The increase in prevalence of asthma may be

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related to environmental factors, including increasing exposure to allergens and pollutants in the air.<sup>19,20</sup> Asthma can impair quality of life and be a major cause of absence from school and work. Data on asthma incidence, morbidity, hospitalization and mortality are needed to show the extent of the need and efficacy of asthma management guidelines.

### Prevalence of childhood asthma in Japan

Thirty years ago, asthma affected approximately 1% of children, while the current prevalence of childhood asthma is approximately 6%. The relationship between asthma and the environment first began to be considered in the last half of the 1960s, which has led to differences in regionally reported asthma prevalence.<sup>17</sup>

In Kita-Kyushu-shi, asthma prevalence surveys was performed for 20 years by using the same survey protocol and at the same regional elementary schools. The survey showed that the prevalence of asthma increased progressively: in 1971 it was 1.71%, in 1981 it was 3.62% and in 1991 it was 5.37%.<sup>18</sup>

### Prevalence of adult asthma in Japan

Various surveys have also been conducted in target groups of adults, such as students or residents of a local community. These surveys have shown no remarkable increase over time in asthma prevalence among adults. Reported prevalence rates have ranged from approximately 1 to 4%.

In Fujieda, Shizuoka, a group of 12 562 residents, aged 15 years and older, were surveyed out of a population of approximately 110 000 residents in the area and a second confirming investigation was performed. In these residents, there were 265 patients with asthma and 48 people with symptoms strongly suggesting asthma as a complication of chronic obstructive pulmonary disease. The asthma prevalence for this city was finally calculated as 3.14%.<sup>19</sup>

### Surveys throughout Japan

Another survey in 24 districts throughout Japan was conducted on people, including those who had undergone health screening examinations at regional health centers, and compulsory school age children and their families. The total number of people surveyed was 8441 children and 11 495 adults. Diagnosis was based on American

Thoracic Society for Division of Lung Diseases (ATS-DLD) established criteria. The results of these surveys showed that:

1. The prevalence of childhood current asthma throughout Japan was 4.0%. Cumulative prevalence was 6.4% when patients with a past history of asthma were also included.
2. Throughout Japan, asthma prevalence in adults varied by age group. The prevalence was 4.0% in subjects aged 16–19 years, 2.8% in subjects aged 20–29 years, 2.3% in subjects aged 30–39 years and 1.8% in subjects aged 40–49 years. The cumulative prevalence for all adults was 3.0% when patients with a past history of asthma were also included. The cumulative prevalence for adults aged 15–30 years was 6.2%.<sup>20</sup>

### Asthma deaths in adults

Approximately 5800–6200 adult asthma patients die in Japan every year. This number has tended to decrease over the years. Asthma deaths showed a tendency to increase in the 5–34-year-old age group around 1990, with a particularly notable increase among males in aged in their 20s.<sup>21</sup>

Surveys in hospitals showed that 19% of reported asthma deaths were considered sudden asthma deaths, occurring within 1 h after onset of an asthma attack. This figure increases to 33% when sudden asthma death was defined as death within 3 h after the onset of the attack. Most asthma deaths occurred in patients with a chronic history of severe asthma, but recent surveys have also shown an increasing incidence of asthma deaths among patients with a past history of only mild to moderate symptoms.<sup>22</sup>

Possible trigger factors responsible for fatal attacks include respiratory tract infections, emotional stress, overwork, tapering doses or discontinuation of corticosteroids, the use of non-steroidal analgesic–antipyretic drugs (e.g. aspirin), overdoses of inhaled  $\beta_2$ -adrenoceptor agonists by metered dose inhaler (MDI) and the use of beta-blockers.<sup>22,23</sup>

### Asthma deaths in children

The asthma death rate in among children aged 0–4 years began to decrease steadily in the 1950s and has now remained at nearly the same level since 1987. The asthma death rate in patients aged 15–19 years began

to slowly rise in 1980, increased considerably in 1985 and peaked around 1990. This increase was especially noticeable in males. However, this asthma death rate has been decreasing since 1997. An increasing number of asthma deaths are now occurring among children with a previous history of only mild to moderate symptoms. Of childhood asthma deaths in 1995, 22.5% occurred in children with a previous history of mild asthma, 23.6% occurred in children with a history of moderate asthma and 32.6% occurred in children with a history of severe asthma.<sup>24,25</sup>

Sudden unexpected exacerbation of symptoms and delays in receiving appropriate medical care are associated with asthma deaths. Factors that contribute to delays in seeking medical care include judgment errors by the patient or family regarding the severity of an asthma attack and overdependency on the use of inhaled  $\beta_2$ -adrenoceptor agonists with an MDI. Another common problem in adolescent patients with asthma is low compliance with medications and other healthcare instructions.<sup>26</sup>

## OUTLINE OF ASTHMA PREVENTION AND MANAGEMENT GUIDELINES 1998 IN JAPAN (JGL98)

In 1993, the Guidelines of Diagnosis and Management of Asthma by Japanese Society of Allergology (JGL1993) was released and these guidelines were revised in 1995. In 1998, the Asthma Prevention and Management Guidelines were drawn up by a research group supported by the Ministry of Health and Welfare Project (JGL1998).<sup>11,12</sup> The JGL1998 was developed by updating JGL1993.

### Definition of asthma

The definition of asthma is an important part of these guidelines, because not only the diagnosis but also the management approach is based on the understanding of asthma.

The definition of adult asthma is as follows:

Asthma is characterized by airway inflammation and varying degrees of airflow limitation, accompanied by recurrent episodes of coughing, wheezing and dyspnea. Airflow limitation may range from slight to life-threatening in severity and at least partially reversible either spontaneously or with treatment. Infiltration of large number of inflammatory cells, including eosinophils, T cells (Th2) and mast cells, contributes to airway inflammation. There is also

notable injury to the airway mucosal epithelium. In patients with chronic disease, airflow limitation tends to become less reversible and it is common to see evidence of airway remodeling including thickening of the airway epithelial basement membrane. In sensitive patients, airway inflammation and airway remodeling are associated with airway hyperresponsiveness.<sup>12</sup>

The definition in JGL98 is updated from JGL93 by adding the concept of airway remodeling. Airway remodeling has been recognized to be typical to chronic asthma and to contribute to persistent airway narrowing and the increase of airway hyperresponsiveness. Several studies have shown that inhaled corticosteroids can or may reverse or prevent airway remodeling.<sup>15,16</sup>

### Key points in management

The key points of JGL1998 are as follows:

1. Asthma is a chronic disorder of the airway. This airway inflammation is thought to cause recurrent episodes of symptoms, variable airflow limitation, airway remodeling and airway hyperresponsiveness. Recently, airway remodeling is stressed to be another major cause of persistent airway narrowing and airway hyperresponsiveness. The most basic management is to prevent this inflammation by eliminating the causal factors, including allergens and air pollution.
2. Asthma is a chronic disease. Asthma can be effectively controlled in most patients, although frequently it cannot be cured.
3. The major causes of morbidity and mortality are underdiagnosis and inappropriate treatment.
4. The goals of management are: (i) to enable patients to enjoy a normal life, comparable to that of healthy people, and to maintain normal growth and development; (ii) to maintain respiratory function as close to normal as possible (i.e. daily peak expiratory flow (PEF) variation < 10% and PEF at least 80% of predicted values); (iii) to prevent nocturnal and early morning cough and dyspnea so that the patient can sleep well; (iv) to prevent asthma attacks; (v) to reduce the probability of asthma-related death; and (vi) to minimize adverse re-actions from asthma medications.
5. Effective control of asthma can be accomplished by an asthma management program as follows: (i) educate patients to develop a partnership in asthma management; (ii) assess and monitor asthma severity with both

symptom reports and lung function measurement, including PEF or forced expiratory volume in 1 s (FEV<sub>1,0</sub>); (iii) avoid or control asthma triggers; (iv) establish individual medication plans for long-term management; (v) establish plans for managing acute exacerbations; (vi) the choice of management should be guided by the severity of the patient's asthma and the patient's life-style; (vii) a step-wise approach to pharmacologic therapy is scheduled following the severity of asthma, and a combination of antiinflammatory and bronchodilating agents can give the best control of asthma; (viii) traditional Kanpo (Japanese formulations of traditional Chinese herbal medicines) medicines can be considered as complementary medications; and (ix) asthma management guidelines should be used as references to establish an asthma treatment plan for each patients by physicians.

## PHARMACOLOGIC MANAGEMENT

### Pharmacologic treatment for long-term management of asthma

#### Drugs

Antiasthma drugs can be divided into two broad categories: controller medications (drugs used for the long-term management of asthma) and reliever medications (drugs used for relieving acute asthma attacks).

**Controller medications** Controller medications (controllers) can be broadly classified into two categories, namely anti-inflammatory drugs and long-acting bronchodilators. The most potent anti-inflammatory controller medications are inhaled or oral corticosteroids. Other controller drugs include antiallergic agents, such as leukotriene receptor antagonists, mediator release inhibitors, histamine H<sub>1</sub> receptor antagonists, thromboxane A<sub>2</sub> synthase inhibitors and receptor antagonists and Th2 cytokine inhibitors. Sustained-release theophylline has anti-inflammatory effects.

Long-acting  $\beta_2$ -adrenoceptor agonists and sustained-release theophylline are generally used as long-acting bronchodilators.

Kampo medications have a long tradition of use in the treatment of asthma. In general, asthma symptoms during the acute stage should be treated with Kampo formulations of the Mao type (e.g. Sho-seiryu-to), while treatment during the chronic stage should focus on Saiko-type formulations, which build up the patient's constitution (e.g. Saiboku-to).

#### Step-wise approach to long-term pharmacologic management of asthma

There are four steps of pharmacologic therapy recommended, depending on the severity of the asthma.

**Step 1: Mild intermittent asthma** This step is indicated for patients with intermittent mild episodes of asthma and baseline pretreatment PEF of 80% or greater of predicted values and diurnal PEF variations of less than 20%.

Treatment is by inhaled or oral  $\beta_2$ -adrenoceptor agonists or short-acting theophylline, as needed, during active symptoms. Inhaled disodium cromoglycate (DSCG) or  $\beta_2$ -adrenoceptor agonists may be taken before physical activity if needed.

Antiallergic agents or low-dose inhaled corticosteroids may also be considered.

**Step 2: Mild persistent asthma** This step is indicated for patients with more frequent mild asthma symptoms, including a baseline pretreatment PEF of 70–80% of their personal best or predicted values and diurnal PEF variations of 20–30%.

Treatment includes low doses of inhaled corticosteroids (beclomethasone dipropionate (BDP) at 200–400  $\mu\text{g}/\text{day}$  or an equivalent dose of fluticasone (FT)), slow-release theophylline and/or leukotriene antagonists or other anti-allergic agents. Long-acting  $\beta_2$ -adrenoceptor agonists may be administered to control nocturnal or morning symptoms.

**Step 3: Moderate persistent asthma** This step is indicated for patients with nocturnal symptoms and some limitation in their daily activities at least once per week and almost daily symptoms of asthma. In addition, patients may exhibit baseline pretreatment PEF of 60–70% of their personal best or predicted values and diurnal PEF variations of greater than 30%.

Treatment includes medium doses of inhaled corticosteroids (BDP: 400–800  $\mu\text{g}$  or an equivalent dose of FT), slow-release theophylline and long-acting  $\beta_2$ -adrenoceptor agonists and/or leukotriene antagonists. Other antiallergic agents or anticholinergics can be considered.

**Step 4: Severe persistent asthma** Patients with severe persistent asthma often require the administration of high doses of inhaled corticosteroids and/or oral corticosteroids and bronchodilator therapy to control their symptoms. These patients may exhibit a baseline pretreatment PEF less than 60% of their personal best or

predicted values and diurnal PEF variations of greater than 30%.

Treatment includes high doses of inhaled corticosteroids (BDP 800–1600 µg/day or equivalent dose of FT), slow-release theophylline and long-acting  $\beta_2$ -adrenoceptor agonists. Oral corticosteroids may be required.

### Pharmacologic treatment of acute exacerbation

Standard drugs used for the treatment of asthma attacks (reliever medications) include  $\beta_2$ -adrenoceptor agonists (inhaled, oral, parenteral and taped), theophylline (intravenous and oral) and corticosteroids (intravenous and oral).

A step-wise approach to pharmacologic treatment is recommended.

#### *Patients with mild symptoms (mild attacks)*

Mild dyspnea is present, but the patient can assume a recumbent position and daily activities are not restricted. The PEF after bronchodilator use is 70–80% of predicted value.

*Treatment* The patient should be treated with a  $\beta_2$ -adrenoceptor agonist inhaled via MDI or nebulizer. If the patient's symptoms improve and remain stable without further treatment for 60 min and if there is confirmation that airway constriction has been relieved (PEF > 70% of predicted value), the patient may be discharged. If no improvement is observed, the patient should receive the next step of treatment for moderate or severe symptoms.

#### *Moderate symptoms (moderate attacks)*

The patient develops moderate asthma symptoms, such as dyspnea, at rest, there is a limitation of daily activities and orthopnea (PEF 50–70% of predicted value).

*Treatment* Treatment consists of repeated  $\beta_2$ -adrenoceptor agonist inhalation by nebulizer, intravenous aminophylline by drip infusion, intravenous corticosteroids, subcutaneous epinephrine and/or oxygen.

#### *Patients with severe symptoms (severe attacks)*

Patients with very severe symptoms may be unable to move and may be forced to assume a bent-forward

posture (orthopnea) because of dyspnea and have difficulty in speaking. The PEF may be less than 50% of personal best value and  $S_pO_2$  may be less than 90% ( $P_aO_2 < 60$  torr).

*Treatment* Treatment consists of aminophylline continuous drip, repeated i.v. corticosteroids, repeated  $\beta_2$ -adrenoceptor agonist inhalation by nebulizer, subcutaneous epinephrine and oxygen inhalation.

#### *Very severe symptoms of asthma: emergencies (very severe attacks)*

At this stage, patients cannot speak or move and may show cyanosis, mental confusion and/or respiratory arrest.

*Treatment* Treatment consists of the continuation of previous drug therapy and admission to an intensive care unit (ICU) with preparation of mechanical ventilation.

## RECOGNITION AND UTILIZATION OF JGL1998

The JGL was first developed in 1993 by the Japanese Society of Allergology (JSA)<sup>7,8</sup> and this guideline was revised in 1995. In 1998, JGL98 was developed by a workshop on Asthma Management Guideline supported by the Ministry of Health and Welfare (MHW) Immunology–Allergy Project. These JGL were developed under essentially the same understanding of asthma and management methods as described in the previous section.

Recognition and utilization of the guidelines was surveyed on at least three occasions.

### 1993 survey

Tsukioka and others performed a survey on the recognition of JGL1993, which was published July 1993. This survey was undertaken approximately 6 months after the publication of JGL1993.<sup>27–29</sup>

A questionnaire on asthma management was sent to 586 physicians, consisting of specialists authorized by the JSA and councilors of the society, who were treating patients with bronchial asthma. Of the total 306 respondents in November 1993, 241 replied to questions relating to adult asthma and 129 responded to questions relating to childhood asthma (including duplicate replies).

First, 97.4% of responding JSA physicians knew of JGL1993 6 months after the release of the guidelines;

57.8% knew the guidelines for adult asthma only, 21.2% knew the guidelines for childhood asthma only and 17.0% knew both guidelines. Overall, the evaluation of JGL1993 for adult and childhood asthma by the physicians was: very good 6.1 and 6.8%, respectively; appropriate 38.0 and 33.3%, respectively; fairly appropriate 52.0 and 52.1% respectively; and inappropriate 3.9 and 3.4%, respectively. This observation showed that JGL1993 was accepted by most asthma specialists at the start of their implementation.<sup>29</sup>

Second, answers regarding the status of diagnosis, patient education and management of asthma indicated that the number of patients with severe asthma had decreased in 1993 for both adults and children compared with 5 years previously,<sup>27</sup> despite the increase in the total number of asthma patients in Japan. Specific IgE radioallergosorbent test (RAST) measurements were frequently performed instead of skin testing for diagnosis and eosinophil counts and bronchodilator responses served as an adjunct to the diagnosis. The usefulness of peak flow measurements was widely recognized and a detailed plan for allergen avoidance (house dust) was often given to patients.

Third, choices regarding treatment were investigated in the same group of allergists. For acute treatment of adults, the drugs most commonly selected by these physicians were, in increasing order of choice, parenteral aminophylline, oxygen inhalation, parenteral steroids and parenteral epinephrine. In the case of schoolchildren (6–16 years), the drugs most commonly selected were parenteral aminophylline, inhaled beta-stimulants, oxygen inhalation, inhaled beta-stimulants + disodium cromoglycate (DSCG), parenteral steroids. For infants (less than 5 years of age), drugs used included inhaled beta-stimulants, parenteral aminophylline, oxygen inhalation, inhaled beta-stimulants + DSCG and parenteral steroids. For maintenance treatment in adults, the drugs most commonly selected by physicians were, in increasing order of choice, oral administration of sustained-release theophylline and inhaled corticosteroids and DSCG inhalation; for school-children (6–16 years), the drugs used were DSCG inhalation, oral administration of sustained-release theophylline, oral administration of antiallergic agent preparation and beta-stimulants + DSCG inhalation; for infants, the drugs used were DSCG inhalation, oral administration of sustained-release theophylline, oral administration of antiallergic agent preparation and beta-stimulants + DSCG inhalation. The responses to the questionnaire showed that

different drugs were selected for the treatment of asthma in adults, schoolchildren and infants.<sup>28</sup>

### 1997 survey

This survey<sup>30</sup> was intended to investigate the degree of recognition and utilization of JGL1993/1995 among members of the JSA (internists and pediatricians) in comparison with non-member physicians, focusing on adult asthma in the JGL.

The recognition, acceptance and utilization of the JGL was surveyed among physicians who diagnosed bronchial asthma by both qualitative survey (door-to-door interview; DDS) and quantitative survey (mail survey; MS) from July 1996 to late January 1997.

### Quantitative MS

The subjects for the quantitative MS were selected from among internists, respiratory specialists and pediatricians who were or were not members of the JSA. Questionnaires concerning the acceptance and utilization of the JGL were mailed to prospective respondents, who were asked to complete the questionnaire and return it by mail. For the MS, 2800 physicians were mailed questionnaires at random. Prospective respondents were asked to complete the questionnaires and return them by mail if they had diagnosed asthma. A total of 1028 physicians (37%) responded to the questionnaires; 552 were members of the JSA, including 388 respiratory specialists, 89 internists and 75 pediatricians. A total of 476 were not members of the JSA, including 55 respiratory specialists, 390 internists and 31 pediatricians.

*Recognition and utilization of the JGL in MS* The following results are based on the 1028 responses to the questionnaires sent by mail.

1. Recognition of the JGL. Question: 'Do you know of the JGL prepared by the JSA?'

Ninety-four percent of the 552 JSA members who did diagnose asthma were aware of the JGL, but only 52.8% of the 476 non-members were aware of it.

2. First impression of the JGL. Question: 'When you read the JGL for the first time, how much difference did you notice from your own previous diagnosis and treatment policies?'

Exactly 45.3% JSA members and 56.8% non-members who read the JGL found a difference between the guidelines and their previous policies.

3. Utilization of the JGL. Question: 'Have you used the JGL as a reference in your diagnosis and treatment of asthma?'

A total of 83.2% JSA members who were aware of the JGL used it; similarly, 83.6% JSA non-members used the JGL.

4. Information sources on asthma management among JGL readers. Question: 'What kind of information do you consider to be basic to your current diagnosis and treatment policy for asthma?'

Among physicians who had read the JGL, the JGL itself and medical journals were the major basis of diagnosis and treatment policies. The JSA meeting gave information for JSA members.

### Qualitative DDS

Ten well-trained interviewers (non-medical) visited physicians after confirming both their willingness to participate in this survey and their having diagnosed asthma. Subjects were randomly selected from among the members of the JSA and non-members, including internists, respiratory specialists and pediatricians. During the first visit, recognition of the JGL was examined and copies of the JGL were left with the physicians for the next visit. During the second visit, information regarding recognition, acceptance and utilization of the JGL was gathered both by formulized questions and by recording the comments of the physicians.

*Subjects for survey and participation rate* The rate of participation in the qualitative DDS was 78%. In February 1997, 285 physicians of the JSA were asked by DDS whether they had treated asthma and 235 replied 'yes'. Then, 183 (78%) of these physicians agreed to participate in the DDS.

*Evaluation of the JGL in DDS* The following results are based on the responses of the 127 physicians who were visited by interviewers. The physicians were given information on the JGL 1-2 weeks before the visits. Interviewers solicited comments on the ease of reading, ease of understanding, amount of information, appropriateness of information, clinical usefulness and overall evaluation. For each of the items, physicians were asked to give their opinions scores as follows: 1, quite good; 2, good; 3, not very good; 4, not good at all; and 5, unknown.

*Overall evaluation* Of the physicians interviewed, 75-91% judged the JGL to be quite good or good. The

overall rate of evaluation of the JGL as 'very good' or 'good' was 81.7% among JSA members and 92.8% among non-members. It seems that JSA members were more critical of the guidelines.

*Evaluation points and problems in the JGL in DDS* Interviewers asked the physicians to comment freely on the JGL and their comments were recorded and categorized as evaluation points or problems. The major evaluation points were establishment of the guidelines themselves and standardization of treatment approach. Second points were introduction of inhaled corticosteroids in step-wise severity dependent treatment systems and the use of peak flow measurement for the evaluation of asthma severity. Concerning problems with the guidelines, the contents and design of the guidelines were not easy to discern and more compact guidelines for non-specialists and generalists were suggested. Other problems were a lack of clarity regarding the safety of inhaled corticosteroids and the efficacy of antiallergic drugs and the position of their use according to the severity of the asthma.

In this 1997 survey, we found in the MS that 94% of JSA members who diagnosed asthma were aware of the guidelines, but only 52% of non-members were aware of them. Although almost half the JSA member and non-member physicians who read the guidelines found differences from their previous policies, once they had read the JGL most began using it in their treatment of asthma. These observations show that JGL are acceptable to most physicians and can be used for asthma management. In the DDS, we found a similar but slightly more favorable response to the JGL. Between 80 and 90% of physicians evaluated the JGL as good after they had read it.

### 1999 survey

From June to August 1999, a survey on the recognition and utilization of JGL1998 was undertaken on members of the JSA and Japanese Society of Pediatric Allergy (JSPA) and non-member physicians who diagnosed asthma patients. The total number of JSA/JSPA members was 1317 (673 internists, 644 pediatricians), while the total number of non-members was 4646 (2626 internists, 2020 pediatricians). Interviewers visited physicians who accepted the interview and recorded their answers.<sup>31</sup>

Of the JSA/JSPA members, 96% knew the contents of JGL1998 and only 1% did not. Of the non-members,

68% knew the contents of JGL1998, 7% did not and the rest (25%) knew only of the publication of the JGL. Regarding the utilization of JGL1998 in the treatment of asthma, of the JSA/JSPA members, 71% used it very much, 5% pretty used it well and 24% did not use it. Of non-members, 79% of physicians who knew the JGL used the JGL very much, while 13% did not.

The first to third choices of antiasthma agents were surveyed. In chronic adult asthma, the sum of the percentage of the first three choices was high for slow-release theophylline and inhaled corticosteroids. There was no significant difference in this choice between JSA/JSPA members and non-members.

In chronic childhood asthma, the first choice was slow-release theophylline, then followed by inhalation of DSCG and  $\beta_2$ -adrenoceptor agonist. The use of inhaled corticosteroids increased along with the severity of asthma.

A significant observation of the survey performed in 1999 is that the awareness of JGL increased from 50 to 70% among non-member physicians, showing the progress of implementation of asthma management guidelines.

## EFFECT OF IMPLEMENTATION OF JGL

Since the publication of the JGL in 1993 and the Global Initiative for Asthma (GINA) in 1995, many of the surveys on the control of asthma at clinics with asthma specialists have shown that the number of hospital admissions and the frequency of emergency room visits due to asthma exacerbation have decreased.<sup>31-34</sup>

Fueki *et al.*<sup>31,32</sup> performed a mail survey of their asthma patients, asking about the frequency of hospital and emergency room visits due to asthma exacerbation and reported on the replies of 205 patients. The frequency of hospitalization and emergency room visits decreased by 70% in 1997 compared with 1993, while the percentage of patients using inhaled corticosteroids increased from 43 to 52% during the same period. These authors also performed a mail survey of physicians, internists and pediatricians (all JSA-authorized specialists) to determine differences in the management of asthma between 5 years ago and the present time. The most common response was that the management of asthma had improved. The major reasons for this answer were reported to be the development of the JGL, wider use of inhaled corticosteroids and peak flow monitoring.

Ishihara<sup>33</sup> and Koshino<sup>34</sup> also reported an improvement of asthma management after the development of

asthma management guidelines and the introduction of inhaled corticosteroids. In accordance with this view, there are many reports on the implementation of asthma management guidelines in the US and Europe.<sup>36-38</sup> Non-compliance with asthma management guidelines was shown to be associated with increased morbidity and costs for asthma-related care.<sup>36-38</sup> Surveys of generalists have shown that treatment and diagnostic procedures were insufficient compared with published asthma management guidelines (including GINA), showing that the treatment procedures given in the guidelines would be made widely known.<sup>36-38</sup> Other studies also report that compliance with asthma management guidelines has improved the control of asthma.<sup>39,40</sup> These reports in Japan and other countries show that utilization of asthma management guidelines improves asthma management and the implementation of these guidelines by general practitioners is critical to improving the quality of life of asthma patients in general. However, it should be noted that patients whose asthma is still not well controlled by conventional therapy recommended by the JGL should be referred to specialists for further evaluation of management plans.

## FUTURE TASKS

These surveys have generated many suggestions for tasks to be undertaken in the near future, including the following.

1. Making the asthma management guidelines widely known among internists and pediatricians, especially non-members of the JSA. For this purpose, the preparation of a concise handbook for desk use, which includes both adult and childhood asthma management, is needed.
2. Assisting asthma patients and their families by providing practical methods for self-management and information for their deeper understanding of the disease. At present, a practical guide to drug inhalation and for the measurement of PEF is needed.
3. The promotion of research, both clinical and basic, to provide information for further progress in asthma management and to investigate the efficacy of the long-term administration of anti-inflammatory agents (including inhaled corticosteroids).

These points should be clarified to ensure progress in the care of asthma patients. Finally, asthma management guidelines should be reevaluated regularly and revised versions should be published regularly and frequently.



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