Allergic reactions to insect stings such as honey bees (Apis mellifera) and wasps (Vespula vulgaris) are one of the most common forms of immunoglobulin E (IgE) mediated systemic allergic reactions accounting for 1.5% to 34% of the anaphylactic cases presented to the emergency department. Although fatalities are more common in adults aged above 45 years, children are also at risk of insect sting allergy.

Systemic reactions (SRs) due to insect sting allergy in children have some unique features. A study conducted in Turkey analysed the clinical characteristics and the risk factors for severe SRs in 76 children (57 boys and 19 girls, mean age: 9.8 ± 3.4 years) with a history of sting SR. Skin tests using wasp and bee venoms and elevated levels of specific IgE (>0.35 kU/L) confirmed IgE-mediated venom allergy in study subjects. Histamine was used as positive control and saline was used as negative control. Patients were also tested for sensitisation towards Aeroallergens using Skin prick tests with the same controls. Systemic reaction of mild intensity was assigned grade I or II, whereas severe intensity was assigned grade III or IV (Mueller grading system).

SRs due to wasp and bee venom were reported in 76% and 24% of the participants, respectively. Increased aggressiveness of wasps compared with honey bees was noted as the main reason for higher incidence of wasp venom allergy compared with bee venom allergy (BVA).

Incidence of insect sting allergy showed seasonal variation (17.1%, 59.2%, 22.4% and 1.3% during spring, summer, autumn and winter, respectively). During winters and springs, bee-
sting reactions were reported significantly more frequently than wasp-sting reactions (38.9% vs. 12.1%; \( P = .017 \)).

Severe SRs (grade III and IV) were reported in 59.2% of the overall study population, while positive aeroallergen sensitisation was seen in 26.3%. About 32.9% had concomitant atopic diseases such as bronchial asthma and allergic rhinitis. Positive sting history was reported in 65.8% of children. Among 50 children who remembered previous sting, 16% reported local large reactions and 56.0% reported SRs.

The characteristics and comparison of SRs following bee and wasp sting allergy are presented in Table 1. Patients with BVA reported significantly higher frequency of previous SR after sting compared with wasp allergy (86.7% vs. 42.9%; \( P = .004 \)). Cutaneous symptoms were the most frequent among all patients (98.7%), followed by symptoms related to respiratory (74.7%), gastrointestinal (41.3%) and cardiovascular (40.0%) systems. Figure 1 depicts the symptoms shown by patients at the time of admission.

Specific IgE (sIgE) for wasp and bee venom were observed in 87% and 45% of cases and positive skin test in 89% and 37% of cases, respectively. Positive sIgE and skin tests for both wasp and bee venom were seen in 35% and 24% of patients, respectively. Positive skin tests for both the insect venom was more common in patients with BVA (47% vs. 17%; \( P = .021 \)) compared with patients allergic to wasp venom. Significant correlations were reported between sIgE levels and skin tests for both bee venom (\( \rho = 0.77; P < .001 \)) and wasp venom (\( \rho = 0.54; P < .001 \)).

Logistic regression analysis (multivariate analysis) identified female sex [odds ratio (OR) 6.4; confidence interval (CI) 1.53-26.89; \( P = .011 \)], eosinophilia (>5%; OR 12.61; CI 1.45-109.71; \( P = .022 \)) and concomitant atopic disease (OR 3.37; CI 1.24-12.25; \( P = .016 \)) as the major risk factors responsible for causing severe SRs.

The major limitations of this study were small sample size and large CIs, which might have limited the accuracy of the results. Well-established parameters that

### Table 1 Characteristics of systemic reactions

<table>
<thead>
<tr>
<th></th>
<th>All Patients</th>
<th>Wasp</th>
<th>Bee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaction(^a) during previous sting</td>
<td>37 (74.0)</td>
<td>23 (65.7)</td>
<td>14 (93.3)</td>
</tr>
<tr>
<td>Severity of SR (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade I</td>
<td>11.8</td>
<td>13.8</td>
<td>5.6</td>
</tr>
<tr>
<td>Grade II</td>
<td>28.9</td>
<td>29.3</td>
<td>27.8</td>
</tr>
<tr>
<td>Grade III</td>
<td>50.0</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Grade IV</td>
<td>9.2</td>
<td>6.9</td>
<td>16.7</td>
</tr>
<tr>
<td>Treatment (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adrenaline</td>
<td>45.8</td>
<td>43.6</td>
<td>52.9</td>
</tr>
<tr>
<td>Corticosteroids</td>
<td>79.2</td>
<td>82.1</td>
<td>68.8</td>
</tr>
<tr>
<td>Antihistamine</td>
<td>94.4</td>
<td>96.4</td>
<td>87.5</td>
</tr>
</tbody>
</table>

\(^a\)Large local or systemic reaction
Figures in parentheses are percentages
Respiratory allergies have a considerable impact on the quality of life of patients compared with cardiovascular disease and diabetes. The increased health care costs in allergy are directly related to the management strategies involved in controlling the disease symptoms and indirectly to the productivity loss of patients at work. A significant difference exists in the availability of allergologists in European countries since allergology is either not recognised or has been discontinued as a separate medical speciality in some of these countries. This has resulted in significant differences in diagnostic and treatment practices.

Allergy Living and Learning (ALL) is a European initiative that aimed to address the concerns related to inadequate knowledge in the area of respiratory allergy. ALL project also evaluated the consistency in the treatment and diagnostic practices across Europe.

The study involved 7004 patients aged 16 to 60 years, allergic to house dust mites, pollen, moulds or animal dander and had respiratory allergy symptoms. These patients were selected after random screening of telephone numbers of a national representative sample in 10 European countries. These countries included Austria, Denmark, Finland, Germany, Italy, the Netherlands, Norway, Spain, Sweden and the United Kingdom.

Data were obtained in 3 steps. An initial telephone interview collected patient demographics, symptoms, diagnosis, treatment and restrictions on daily life. Following this, patients received a self-administered questionnaire that consisted of complex statements describing the allergic condition and quality of life. A second telephone interview at a later date collected the questionnaire answers.

**Allergy Characteristics**

Nearly 50% of the patients had experienced symptoms of allergy for more than 10 years. The average duration of symptoms was 14.5 years. Allergic rhinitis, asthma, skin allergy and food allergy were prevalent in 66%, 26%, 22% and 14% of the patients respectively.

Pollen was the most common allergen (76%), followed by house dust mites (40%). Moulds and dander from dog, cat and other animals were the cause of sensitisation in 9%, 18%, 30% and 14% of patients, respectively.

Asthma was more frequent among patients with perennial allergy to house dust mite, moulds, and cat and dog dander compared with those who had pollen allergy (40%-51% vs. 26%).

**Allergy Diagnosis**

Diagnosis of respiratory allergy did not involve a doctor in 16% of the patients, a figure exceeding 20% in countries such as Denmark.

**Reference**

Finland and the United Kingdom. 

**Figure 2** demonstrates a country-specific data on the proportion of patients who underwent no clinical diagnosis.

Diagnostic tests for allergy were not performed in 33% of patients. Among these, 43% were never diagnosed by a doctor and 48% were diagnosed by a family physician. Only 7% were diagnosed by a specialist or both a specialist and a family physician. **Figure 3** demonstrates a country-specific data with the percentage of patients who underwent no diagnostic tests.

**Allergy Treatment**

Allergy medications were used by 80% of the patients. Among these, 83% were prescribed by doctors. Allergy-specific immunotherapy and depot corticosteroid treatment were received by 16% and 7% of the patients respectively. The usage of depot injection was highest in Denmark and Finland (12% and 13% respectively). Allergy-specific immunotherapy was used frequently in Spain (38%) and Italy (25%). Family physicians prescribed depot medications (25%) more often than allergy-specific immunotherapy (16%), whereas specialists preferred allergy-specific immunotherapy (45%) compared with depot medications (34%). About 20% of the patients did not use any allergy medication, of whom 10% had severe allergy symptoms. The proportion of patients taking allergy medication in various forms is presented in **Figure 4**.
The majority of the patients used allergy medication for symptomatic treatment only during the season (80%). Long-term treatment to prevent symptoms was received by 14% of the total patients. Symptomatic allergy medication was continued for more than 20 years by 11% of the patients.

**Perception and Knowledge of Treatment**

About 70% of the treated patients reported satisfactory or very satisfactory symptom relief by the allergy medication. Effectiveness of the drug (74%) and ease of drug usage (38%) were the contributing factors for the positive perception of the medication that was observed in 83% of the patients. Need to seek an appointment with the doctor to obtain the medication (19%), lack of effectiveness of the drug (14%), and cost (13%) were the major factors that contributed towards negative perception. Only 23% of the patients knew well or really well about allergy-specific immunotherapy. About 47% had very little knowledge about this therapy and 30% of the patients had never heard of allergy-specific immunotherapy.

**Quality of Life and Restrictions on Daily Activity**

A severely restricted daily life was seen in 11% of the allergic patients, but no such restriction was seen in 31% of the patients. A limited restriction to the daily activities was seen in 58% of the allergy sufferers. The major restricted daily activities were running up stairs (47%), exercising (55%), gardening (44%), housework (38%), outdoors activities (59%) and visiting friends and relatives (36%). Trouble associated with sleeping was reported in >50% of the participants. Allergy symptoms led to embarrassments in 35% of patients. Apart from medication, patients tried various ways to minimise the symptoms such as change to special bedding (17%), special or no carpets at home (15%), frequent cleaning (28%), closing the windows (22%), avoiding contact with pets (25%) and outdoor activities (18%), and restricted visits to friends/relatives (10%).

Inadequate diagnosis and inconsistent treatment of respiratory allergy is evident across Europe, which affects the quality of life of allergic patients. Addressing these issues as well as improving the awareness, knowledge and execution of appropriate and best treatments would improve the treatment of respiratory allergic diseases.

**Reference**