



Original article

A workshop with practical training for anaphylaxis management improves the self-efficacy of school personnel



Kemal Sasaki, Shiro Sugiura, Teruaki Matsui, Tomoko Nakagawa, Joon Nakata, Naoyuki Kando, Komei Ito*

Department of Allergy, Aichi Children's Health and Medical Center, Aichi, Japan

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ABSTRACT

Background: School personnel are required to guarantee a secure school environment for children suffering from severe food allergies. We organized a workshop for school personnel to learn the appropriate management of anaphylaxis that included practical training with an adrenaline auto-injector (AAI). The objective of this study was to evaluate the workshop in terms of the improvement of self-efficacy (SE) of participants to deal with anaphylaxis.

Methods: All 93 school nurses, 73 schoolteachers and 110 childcare workers participating in the study completed a questionnaire before and after the workshop. The SE of the participants was evaluated using an original 15-item questionnaire.

Results: Before the workshop, the SE of school nurses was the highest among the profession groups, and being involved with children prescribed an AAI was a common factor associated with a high SE. After the workshop, the SE increased in all groups, but most apparently in school nurses and those involved with children prescribed an AAI. The presence of an emergency plan was positively associated with the SE of schoolteachers only after the workshop, even though no such association existed beforehand.

Conclusions: Practical instruction of school nurses and school personnel involved with children prescribed an AAI resulted in dramatic improvement of the SE. These people are expected to play a central role in the development of an anaphylaxis management plan in their schools.

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Introduction

It is common for children with food allergies to experience accidental exposure to allergens and to develop allergic symptoms at school.^{1–3} An epidemiological study showed that 36% of 41 accidental reactions in children with a severe food allergy at their school involved two or more organ systems.² School personnel are required to be familiar with food allergies, and an action plan for allergic emergencies should be developed for every school.^{4,5}

Adrenaline is regarded as the first-line therapy for anaphylaxis. Nowak-Wegrzyn et al.² have shown that this drug has been administered to children in almost 15% of accidental cases in schools. Fatal anaphylaxis in school settings were often associated with a delay of treatment with adrenaline, generally because of an inadequate action plan against allergen exposure.^{1,2,6,7}

In Japan, an adrenaline auto-injector (AAI, Epipen[®]) became available for children in 2005. Despite this, a fatal accident of milk-induced anaphylaxis occurred at an elementary school in December 2012. This shocking event triggered a concentrated social effort to improve countermeasures against anaphylaxis within the school setting.⁸ As a part of this movement, many workshops for school personnel have been conducted on the management of children with life-threatening allergies.

The effective management of such children requires an appropriate behavior of the relevant person or people involved. According to a social cognitive theory, human behavior is based on personal knowledge and attitudes. Furthermore, self-efficacy (SE) is one of the most important antecedents of behavioral changes.⁹ SE refers to an individuals' belief in their own ability to organize and execute an appropriate action in a prospective situation.¹⁰ Those with a high SE have a tendency to take a favorable action, such as intense efforts to overcome problems in social situations. In recognition of the role of SE, the effects of a workshop should be evaluated not only by their contribution to participants' knowledge, but also by their ability to improve SE.

* Corresponding author. Department of Allergy, Aichi Children's Health and Medical Center, 7-426 Morioka-cho, Obu-city, Aichi 474-8710, Japan.

E-mail address: koumei_itoh@mx.achmc.pref.aichi.jp (K. Ito).

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We conducted a series of workshops for school personnel on appropriate countermeasures against anaphylaxis at school. In this study, we evaluated the SE of attendees before and after the workshop, and analyzed the factors associated with the improvement of the SE.

Methods

Subjects

The subjects enrolled in this study were participants at the workshops regarding the management of anaphylaxis at school. The workshops were held eight times between June and September 2013 at Aichi Children's Health and Medical Center in cooperation with the non-profit organization, Allergy Support Network (Nagoya, Japan). These workshops were announced on the websites of the Allergy Support Network and our institute. A total of 759 participants attended the workshops, with no repeat attendees.

An anonymous, self-administered questionnaire was conducted before and after each workshop. Respondents working out of Aichi prefecture were excluded, leaving a sample of 110 school nurses, 78 schoolteachers working in public elementary or junior high school, and 120 childcare workers in nurseries. Of these, 93 school nurses (84.5%), 73 schoolteachers (93.6%) and 110 childcare workers (91.7%) returned fully completed questionnaires. The job categories of participants excluded in this study are shown in [Supplementary Table 1](#).

The purpose and design of the research, the level of data protection and the voluntary nature of participation were clearly stipulated in the opening statement of the questionnaire. It was also explicitly written that submission of the questionnaire sheet would be considered as consent to participate in the research. This study was approved by the institutional ethics committee.

Table 1
Self-efficacy questionnaire for anaphylaxis management.

Please check the most appropriate response to each item using the scale: 1 = completely lacking confidence, 2 = lacking confidence, 3 = somewhat lacking confidence, 4 = undecided, 5 = somewhat confident, 6 = confident, 7 = completely confident.	
Item no.	How confident are you that
1	You can identify children with a documented risk of anaphylaxis at your school?
2	You can have a preliminary talk with family about the care of a child with a documented risk of anaphylaxis?
3	You can recognize anaphylactic symptoms in children within the school?
4	You know the initial action to take following recognition of anaphylaxis?
5	You know when to call an ambulance in the event of an anaphylactic emergency?
6	You could properly explain an anaphylactic emergency during an emergency call?
7	You know when to consider administration of the adrenaline auto-injector, Epipen®?
8	You know when to administer the adrenaline auto-injector, Epipen®?
9	You know the steps to take to prepare the adrenaline auto-injector, Epipen®, for use?
10	You know the correct site for administration of the adrenaline auto-injector, Epipen®?
11	You know the duration of effectiveness of adrenaline used in the treatment of anaphylaxis?
12	You can instruct someone in the correct care of anaphylactic symptoms?
13	You can instruct someone in the correct administration of the adrenaline auto-injector, Epipen®?
14	You could hold a leadership position for the correct care of anaphylactic symptoms in your school?
15	You can provide life support to children with anaphylactic symptoms in your school?

Workshop

The workshop consisted of three sessions: a presentation of anaphylaxis, practical training about AAI administration using trainer devices (Pfizer Japan Inc., Tokyo, Japan) and a question-and-answer session. We used original educational material based upon the experience of experts. All of the lecturers had extensive experience with oral food challenges, the treatment of anaphylaxis, patient education and AAI prescription.

The lecture topics included the mechanisms, signs and symptoms of food allergy, prevention of accidental allergen exposure and the medical treatment of adverse reactions. We also emphasized the systematic workflow of the school personnel, including the individual roles in an emergency situation.

Of note, we presented some actual cases in which an AAI was administered by the patients or school nurses.

During the practical training, all participants were advised to use a training device, and some representative participants tried administering a real AAI on the thigh of the model doll.

Bandura¹⁰ previously identified the four main sources of SE, and our workshops provided three of them. Mastery of experience refers to positive cognition developed from successful past experience, which was achieved through the practical training of AAI administration. Social modeling refers to an observation of a successful performance by someone whose capabilities are considered similar to their own. This source was enhanced through the presentation of the real cases and live demonstrations of AAI administration. Social persuasion is defined as the internalization of appreciation given by respected persons, such as an instructor or leader. This was provided through verbal feedback during the practical training. In providing feedback, instructors adopted realistic and positive commentary, and were careful to use positive correction if incorrect handling was observed. The last source of SE, physiological and emotional states, depends on the individual conditions in a given situation.

Questionnaire items

The questionnaire identified the personal characteristics of the subjects, such as their job title, experience with allergic events, number of children prescribed an AAI in their workplace and presence of a dedicated emergency action plan for allergic reactions. The individual experience with food-related allergic events was divided into two groups. The severe group included subjects who had ever used a medication to deal with the situation. The mild group included those who had never dealt with cases requiring medication.

The SE was measured using an original 15-item questionnaire that was administered before and after the workshop ([Table 1](#)). The items were created by our staff, including pediatric allergists, public health physicians and dietitians, with reference to Bandura's theory and previous reports.^{9,11} A preliminary questionnaire draft was tested and reviewed by school nurses, schoolteachers and childcare workers. Based on their feedback, some items were adjusted in order to improve the face validity. None of these reviewers took part in the study itself.

A 7-point Likert-scale was used in which subjects were asked to rate their confidence level for each of the 15 items: 1 = completely lacking confidence, 2 = lacking confidence, 3 = somewhat lacking confidence, 4 = undecided, 5 = somewhat confident, 6 = confident, 7 = completely confident. The SE was evaluated using a total cumulative score with a possible range of 15–105 points. The Cronbach's alpha, an index for internal consistency, of the scale was 0.965. The reliability was assessed using the split-half method with the odd-even system ($\rho = 0.983$).

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