

Hypothesis & Experience
Original Article



Measures for food allergy emergency in nurseries

Mitsunobu Kaneko^{1,2,*}, Tomoko Miyoshi², Yoshihiro Miyashita², Riku Hayashi², and Takuji Hashimoto²

¹Kaneko Clinic, Kanagawa, Japan

²The Department of Nursery Health Administration in Kawasaki Branch of Japan Medical Association, Kawasaki city, Kanagawa, Japan



Received: Jun 8, 2022

Accepted: Oct 13, 2022

Published online: Oct 17, 2022

***Correspondence to**

Mitsunobu Kaneko

Kaneko Clinic, 4-4-13, Maginu, Miyamae-ku, Kawasaki city, Kanagawa 216-0035, Japan.

Tel & Fax: +81-44-854-1611

Email: kanekomk@gmail.com

Copyright © 2022. Asia Pacific Association of Allergy, Asthma and Clinical Immunology. This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Conflict of Interest

The authors have no financial conflicts of interest.

Author Contributions

Conceptualization: Mitsunobu Kaneko, Tomoko Miyoshi, Yoshihiro Miyashita. Formal analysis: Mitsunobu Kaneko. Investigation: Mitsunobu Kaneko, Tomoko Miyoshi, Yoshihiro Miyashita. Methodology: Mitsunobu Kaneko, Tomoko Miyoshi. Project administration: Yoshihiro Miyashita, Riku Hayashi, Takuji Hashimoto. Writing - original draft: Mitsunobu Kaneko. Writing - review & editing: Mitsunobu Kaneko.

ABSTRACT

Background: As food allergy potentially can induce life-threatening anaphylaxis, measures for food allergy are required at nurseries caring for food allergy children, but a large-scale factual investigation has not been carried out.

Objective: We evaluated measures for food allergy emergency in nurseries.

Methods: A questionnaire survey regarding emergency measures in all authorized nurseries (411 facilities including 20,586 children) was conducted in Kawasaki city, Japan.

Results: The recovery rate of the questionnaire was 46.5%, which include 14,343 children of 191 facilities in total. A total of 637 children (4.4%) in 157 facilities (82.2%) requires elimination diets that were suggested by physicians. Among them, 22 children had been suggested to undergo the use of epinephrine auto-injection kit for emergency. 161 facilities (84.3%) had set a specific manual for emergency of food allergy. Emergency cases over the past one year were 4 cases and there was no case that had been suggested to use epinephrine auto-injection kit. All were anaphylaxis and the causes of these included 2 accidental digestion of culprit foods and the causes of other 2 cases were unknown. A case who required no elimination diet showed first episode of anaphylaxis. All cases were recovered.

Conclusion: High percentage of nurseries in Kawasaki city has cared for food allergy children. While many children with food allergy have been in nurseries, only several cases of anaphylaxis have been reported for a 1 year. Among 4 cases of anaphylaxis, no specific cause has been recognized in 2 cases and 1 case has been the first episode of anaphylaxis. While most of nurseries have set specific measures for emergency of food allergy, there is certain possibility that nursery staffs can encounter the first episode of anaphylaxis even if there is no food allergy child. For all nurseries, emergency measures for food allergy are vital.

Keywords: Food allergy; Anaphylaxis; Child; Nursery

INTRODUCTION

As food allergy potentially can induce life-threatening anaphylaxis [1], measures for food allergy are required at nurseries caring for food allergy children.

Kawasaki city, Japan, is located next to the capital city Tokyo, and its population is over 1,500,000. The Kawasaki city office has authorized the nurseries to administer the health and safety of nursery children.

The Department of Nursery Health Administration in Kawasaki Branch of Japan Medical Association and The Department of Nursery Administration in Kawasaki city office have been constituting the committee of nursery health administration in Kawasaki city, which has been managing all health issues including food allergy in the authorized nurseries since 1995. In terms of the food allergy management, the committee has been surveying the number of food allergy children with elimination diets and children who have been instructed to use adrenaline auto-injector in nurseries every year [2]. The committee has also established the specific measures for food allergy which are based on the guideline from Japan's ministry of health, labor and welfare [3]. We have introduced them and called on the nurseries to set up a specific manual for food allergy emergency as well.

These measures for food allergy, in particular for emergency in nurseries are essential. However, a large-scale factual investigation of efficiency of measures for food allergy in nurseries has not been carried out.

In this study, we aimed to evaluate the efficiency of our measures for food allergy emergency in Kawasaki city nurseries.

MATERIALS AND METHODS

In March, 2019, upon acquiring informed consent from The Department of Nursery Administration in Kawasaki city office, we sent out the questionnaire regarding emergency measures in all authorized nurseries (411 facilities including 20,586 children) in Kawasaki city, via email. We asked the managers of every nursery to answer the questionnaire (**Table 1**).

From the result of the answers to the questionnaire, we asked the nurseries which had experienced emergency cases further questions (**Table 2**).

This study was approved by the Institutional Review Board of The Department of Nursery Health Administration in Kawasaki Branch of Japan Medical Association (IRB No. 1-2019.).

Table 1. Questionnaire 1

1	How many children belong to your nursery?
2	How many food allergy children on food elimination diet belong to your nursery?
3	How many children are instructed to use adrenaline auto-injectors for emergency of food allergy?
4	How many cases have been referred to ambulances due to food allergy emergency over the past 1 year?
5	Have you set up a specific manual for food allergy emergency?
6	Have you educated all of nursery staff for food allergy emergency along the manual?

Table 2. Questionnaire 2

1	How old were emergency cases?
2	Did the emergency cases need elimination diets in nurseries?
3	Could you find what symptom of emergency cases was before referring?
4	Were the causes of emergency mis-delivery of foods?
5	Have emergency cases been instructed to use AAR?
6	Did you use AAR to emergency cases?

AAR, adrenaline auto-injector.

RESULTS

From the annual survey, there were 411 authorized nurseries, 20,586 children which included 1,316 elimination diet cases with food allergy and 41 adrenaline auto-injector instruction cases in Kawasaki city.

The recovery rate of the questionnaire was 46.5%, which included 14,343 children of 191 facilities in total. A total of 637 in 14,343 children (4.4%) in 157 in 191 facilities (82.2%) requires elimination diets that were suggested by physicians. Among them, 22 children had been suggested to undergo the use of adrenaline auto-injector kit for emergency (Table 3). One hundred sixty-one facilities (84.3%) had set a specific manual for emergency of food allergy (Table 4).

Emergency cases over the past one year were 4 cases and there was no case that had been suggested to use epinephrine auto-injection kit by medical doctor before. All were anaphylaxis and the causes of it included 2 accidental ingestion of culprit foods and the causes of other 2 cases were unknown. A case who required no elimination diet showed first episode of anaphylaxis. All cases were recovered (Table 5).

DISCUSSION

Food allergy is a life-altering disease, which is often life threatening [1] and an increase in the number of children with food allergy and anaphylaxis has been reported [4]. Thus, as food allergy emergency in children potentially can lead serious problems at nurseries [5], Kawasaki city office has been setting several kinds of preventive measures for food allergy emergency, including the registration of children with food allergy, elimination diets, the instruction of epinephrine auto-injection kit and the preparation of emergency manuals.

Table 3. Result of the questionnaire survey

Variable	No. (%)
Total No. of nurseries	411
No. of the responding nurseries	191 (46.5)
Total No. of nursery children	28,509
Total No. of nursery children in the responding nurseries	14,343 (50.3)
Total No. of elimination diet cases	1,316
No. of elimination diet cases in the responding nurseries	637 (48.4)
Total No. of adrenaline auto-injector instruction cases	41
No. of adrenaline auto-injector instruction cases in the responding nurseries	22 (53.7)

Table 4. Implementation of the food allergy emergency measures and the number of emergencies

Variable	No. (%)
Total No. of the nurseries setting the specific manuals	161/191 (84.3)
Total No. of the nurseries educating all of staff along the manuals	155/191 (81.1)
Total No. of food emergency cases to call ambulance over the past 1 year	4
Total No. of adrenaline auto-injector use over the past 1 year	0

Table 5. The causes and symptoms of food emergency cases

Case No.	Age (yr)	Elimination diets	Causes	Instruction of adrenaline auto-injector use	Symptoms
1	4	(+)	Mis-delivery of foods	(-)	Anaphylaxis
2	1	(+)	Mis-delivery of foods	(-)	Anaphylaxis
3	1	(+)	Unknown	(-)	Anaphylaxis
4	0	(-)	Unknown	(-)	Anaphylaxis

According to the registration of food allergy, high percentage of nurseries in Kawasaki city has cared for food allergy children [2]. According to the increase of allergy children, introducing certifications about allergy by medical doctors are essential in nurseries in order to pick up allergic children at risk [2, 6]. In this study, only 4 cases of anaphylaxis have been reported for a 1 year, while many children with food allergy have been in nurseries. It may be expected that not so many cases of anaphylaxis can occur in nurseries with appropriate preventive measures for food allergy.

On the other hand, among 4 anaphylaxis cases in this study, no specific cause has been recognized in 2 cases and 1 case has been the first episode of anaphylaxis, while there was no epinephrine auto-injector instructing case in them. It has been considered that instruction of using epinephrine auto-injector in nurseries is necessary [7]. However, it may not be so efficient for children without its instruction by medical doctors. Nursery staff can use epinephrine auto-injector for just children who have been prescribed it by medical doctors individually as the care giver as a special occasion. When nursery staff find anaphylaxis which has no prescription of epinephrine auto-injector by doctors, as medical procedures are allowed to be done only by licensed medical staff in Japan, there is no specific measures to deal with anaphylaxis urgently but preventive measures including elimination diets.

Every food allergy child in nurseries who has been diagnosed by medical doctors does not cause anaphylaxis necessarily. While some cases have been instructed to use epinephrine auto-injector for emergency, other cases have not been considered their necessity of epinephrine auto-injector by medical doctors. It can be assumed that there is the lack of awareness for food allergy emergency among medical doctors.

There have been appropriate elimination diets introduced to prevent food allergy emergency in Kawasaki city nurseries. As only 2 cases of accidental ingestion of culprit foods causing anaphylaxis were reported for 1 year, the preventive measures of food allergy in nurseries may be efficient. However, not all anaphylaxis could be excluded only with conventional preventive measures. In particular, the first episode of anaphylaxis which can not be prospected may not be prevented with any preventive measures. Therefore, the measures for emergency of food allergy may be more vital than any preventive measures because first episode of anaphylaxis by unknown foods are inevitable.

Several limitations associated with the present study warrant mention. First, these data were collected in nurseries of Kawasaki city. Our findings therefore may not present the whole picture of food allergies and the relevant measures in nurseries. Second, the credibility of this questionnaire, which was answered by nursery staffs, was not scientifically evaluated. Third, we could not investigate the detail of food emergency cases in nursery including specific symptoms because this study was based on the questionnaire from nursery staffs, while there are potentially several kinds of causes of anaphylaxis [8, 9]. However, every emergency case in this study has been considered anaphylaxis by nursery staff before referring to ambulances and they have been diagnosed as anaphylaxis by medical doctors later. Measures for food allergy in Kawasaki city nurseries have been established in line with Japanese Guideline for Food Allergy [3]. It is assumed that nursery staff could find emergency cases of allergy with the guideline describing how to find anaphylaxis. As well as diagnosis of food allergy, applicable cases for elimination diets have been described in the guideline. This guideline has instructed elimination diets for food allergies which are classified into 4 representative clinical types, infantile atopic dermatitis associated with food allergy, immediate-type food

allergy, neonatal and infantile gastrointestinal allergy, and other special types including food-dependent-exercise-induced anaphylaxis and oral allergy syndrome. Immediate-type food allergy including anaphylaxis and infantile atopic dermatitis associated with food allergy are mainly subjects of elimination diets in nurseries. Some cases who have been instructed food eliminations are assumed to be in line with the guideline regardless of existing anaphylaxis episode.

Although investigating causes of anaphylaxis is important for nurseries to manage it, this study could show certainly that the emergency measures for allergy is inevitable with unpredicted cases regardless there being any food allergy children in nurseries.

While most of nurseries have set specific measures for emergency of food allergy, there is certain possibility that nursery staffs can encounter the first episode of anaphylaxis even if there is no food allergy child. For all nurseries, emergency measures for food allergy are vital.

REFERENCES

1. NIAD-Sponsored Expert Panel Boyce JA, Assa'ad A, Burks AW, Jones SM, Sampson HA, Wood RA, Plaut M, Cooper SF, Fenton MJ, Arshad SH, Bahna SL, Beck LA, Byrd-Bredbenner C, Camargo Jr CA, Eichenfield L, Furuta GT, Hanifin JM, Jones C, Kraft M, Levy BD, Lieberman P, Lucciolli S, McCall KM, Schneider LC, Simon RA, Simons FER, Teach SJ, Yawn BP, Schwanger JM. Guidelines for the diagnosis and management of food allergy in the United States: report of the NIAID-sponsored expert panel. *J Allergy Clin Immunol* 2010;126(6 Suppl):S1-S58.
2. Kaneko M, Miyoshi T, Miyashita Y, Onogi K, Okano Y, Shimizu A, Nakajima N, Sumida N. Food allergy in nursery children of Kawasaki city, Japan. *Asian Pac J Allergy Immunol* 2021;39:117-23.
[PUBMED](#)
3. Food Allergy Committee, Japanese Society of Pediatric Allergy and Clinical Immunology. Japanese guideline for food allergy 2021. Tokyo: Kyowa Kikaku; 2011. (Japanese).
4. Simons FE, Ebisawa M, Sanchez-Borges M, Thong BY, Worm M, Tanno LK, Lockey RF, El-Gamal YM, Brown SG, Park HS, Sheikh A. 2015 update of the evidence base: World Allergy Organization anaphylaxis guidelines. *World Allergy Organ J* 2015;8:32.
[PUBMED](#) | [CROSSREF](#)
5. Ward CE, Greenhawt MJ. Treatment of allergic reactions and quality of life among care givers of food-allergic children. *Ann Allergy Asthma Immunol* 2015;114:312-8.e2.
[PUBMED](#) | [CROSSREF](#)
6. Koremitsu S, Toyokuni K, Handa Y, Gotho C, Wasada R, Kato R, Kawano N, Ikeuchi M, Okamoto T, Kiriya M, Takahashi M, Takano T, Haigo A. Medical certification reduces the number of children requiring allergen elimination diets for school lunches. *Asia Pac Allergy* 2017;7:92-6.
[PUBMED](#) | [CROSSREF](#)
7. Korematsu S, Kaku M, Kitada S, Etoh M, Kai H, Joh M, Nakano K, Nakamura M, Sato K, Wakita Y, Matsumoto S, Yoda K, Andouille A, Ishiwa S, Fujimoto T. Anaphylaxis and onsite treatment in schools, kindergartens, and nurseries. *Pediatr Int* 2022;64:e14973.
[PUBMED](#) | [CROSSREF](#)
8. Tanno LK, Demoly P. Anaphylaxis in children. *Pediatr Allergy Immunol* 2020;31 Suppl 26:8-10.
[PUBMED](#) | [CROSSREF](#)
9. Gaspar Â, Santos N, Faria E, Pereira AM, Gomes E, Câmara R, Rodrigues-Alves R, Borrego L, Carrapatoso I, Carneiro-Leão L, Morais-Almeida M, Delgado L, Pedro E, Branco-Ferreira M. Anaphylaxis in children and adolescents: The Portuguese Anaphylaxis Registry. *Pediatr Allergy Immunol* 2021;32:1278-86.
[PUBMED](#) | [CROSSREF](#)