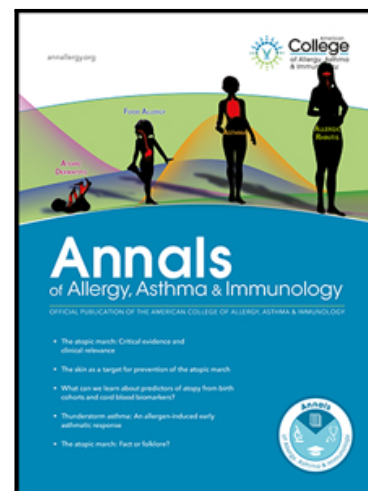


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Level of competence of primary and secondary school teachers in the management of anaphylaxis

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Keywords

adrenaline auto-injector; allergy; anaphylaxis; attitude; knowledge; school; teacher

Abbreviations/Acronyms: none

Anaphylaxis is a severe hypersensitivity reaction, with the highest incidence in early childhood.¹ It can lead to respiratory arrest, so early detection and immediate reaction is needed.² However, this is not always simple, as most of the reactions occur far from hospitals, for example, at school.³ Since children spend much of their time in school, teachers should know how to identify and manage these situations. In Spain, training programmes aimed at teachers for the management of anaphylactic reactions, such as the "School Alert (*Alerta Escolar*) Program",⁴ have been developed. However, these initiatives may not be enough,⁵ so the aim of the current study is to determine the level of competence of school teachers in the management of anaphylactic reactions according to their knowledge of and attitudes towards them.

A cross-sectional study was carried out with a convenience sample of teachers recruited from all the primary and secondary schools (children aged 3–11 years old), which consisted of two public and two state schools in Noia (Galicia, Spain) between January and February 2018. The study was performed with the approval of the schools' teachers' boards. Likewise, we obtained the voluntary consent of the teachers who participated. Pursuant to the Declaration of Helsinki and the Data Protection Act 15/1999, data confidentiality was guaranteed at all times.

All the teachers from the four schools, of both sexes, and aged 18 years or older were invited to participate in the survey. The teachers' knowledge of and attitudes towards anaphylaxis were assessed by the questionnaire developed by Ercan et al.⁵, with prior authorization from the authors. The validated questionnaire consisted of 25 items structured into four sections: sociodemographic data, experience with anaphylaxis, knowledge of symptoms and causes of anaphylaxis, and knowledge of management of anaphylaxis. Immediately after the questionnaire, the teachers participated in a simulated case of anaphylaxis, in which teachers were requested to administer an adrenaline autoinjector (Jext®) to a doll. The administration was monitored using standardized documentation.

Bivariate analysis was performed using Pearson's chi-squared test, the Mann–Whitney U test, and Student's t-test. The programme PSPP version 0.8.4 was used for the statistical processing of the data. P values < 0.05 were considered to be significant.

A total of 92 teachers decided to participate in the study (response rate of 86.7%), 52 from public schools and 40 from state schools. The majority were women (73.9%) with an average age of 42.9 ± 9.9 years and with more than 15 years of professional experience (15.8 ± 9.8); furthermore, they were fundamentally in charge of teaching common subjects.

Regarding the teachers' previous experiences with allergic reactions, it was noted that a small percentage (20.7%) had witnessed a serious allergic reaction and the majority (91.3%) knew which of their students had allergies.

Despite the fact that only approximately a third of the teachers had received previous information about anaphylaxis from diverse sources, the majority of them (90.2%) stated to have knowledge of allergic reaction symptoms and identified their main causes. However, it is noteworthy to mention the lack of knowledge of rubber and physical exercise as potential causes of anaphylaxis.

On the other hand, the teachers showed that they had scarce knowledge regarding the management of anaphylactic reactions (Table 1). It was, at the very least, surprising because the majority (~75%) had claimed that they knew what adrenaline or an autoinjector was.

Only significant statistical differences were found between public and state school teachers with reference to previously received information about anaphylaxis (26.9% vs. 52.5%, respectively), the emergency medications available at the school, and the route of administration of the adrenaline (Table 1).

Out of the 92 teachers who filled in the questionnaire, 63% decided to participate in the simulated case. The main results were: (i) only 55.2% had ever seen an autoinjector and only 5.2% knew how to use it; (ii) approximately 25% did not know that adrenaline is administered in the thigh; (iii) the average time needed to administer adrenaline was over a minute; and (iv) almost all the teachers needed to read the instructions to carry out the administration of the drug and 13.8% applied the autoinjector to themselves.

The current study has shown that even if public and state school teachers know the main causes and clinical symptoms of allergic reactions, their knowledge of how to handle such situations is scarce, which was corroborated by the results from the simulation. To our knowledge, this is the first study carried out in Spain to evaluate primary and secondary school teachers' level of competence in the management of anaphylactic reactions from an eminently practical perspective.

In this study, participation was voluntary. The voluntary nature of participation could have favored the inclusion of those teachers who had more knowledge of anaphylaxis, introducing a selection bias. However, this seems quite improbable given the high participation rate. Likewise, another limitation of the study would include the absence of information regarding private school teachers' knowledge, as in the region of Noia, there are not any private schools.

Our results are in line with two recently conducted studies^{6,7}, which reported a low use of adrenaline autoinjectors during anaphylactic emergencies. According to this, we think that it should be important: (i) to develop educational interventions in a largely practical way to improve the skills of teachers when dealing with anaphylactic reactions; (ii) to inform teachers that adrenaline in an autoinjector is quite safe and that the side effects are more frequently associated with intravenous adrenaline;⁸ (iii) to remind teachers that schools have a legal obligation to ensure the welfare of children while they are in school;⁹ (iv) to include autoinjectors in the first aid kits of schools because many children have their first allergic reaction in a school setting;¹⁰ and (v) to insist that from the moment the teacher calls emergency services to communicate an emergency situation, the medical coordinator who tells them what to do over the phone is fully responsible for this situation, exonerating the teacher of any responsibility.⁴

Conflict of interest

none.

Funding source

none.

REFERENCES

- 1 Tejedor Alonso MA, Moro Moro M, Múgica García MV. Epidemiology of anaphylaxis. *Clin Exp Allergy*. 2015;45:1027-1039.
- 2 Tiyyagura GK, Arnold L, Cone DC, Langan M. Pediatric anaphylaxis management in the prehospital setting. *Prehosp Emerg Care*. 2014;18:46-51.
- 3 Muraro A, Agache I, Clark A, et al. EAACI food allergy and anaphylaxis guidelines: managing patients with food allergy in the community. *Allergy*. 2014;69:1046-1057.

- 4 Regional Government Education and University Department. Plan Alerta Escolar. 2007. Available from: <http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines>. Accessed June 5, 2018.
- 5 Ercan H, Ozen A, Karatepe H, Berber M, Cengizlier R. Primary school teachers' knowledge about and attitudes toward anaphylaxis. *Pediatr Allergy Immunol*. 2012;23:428-432.
- 6 O'Keefe A, Clarke A, St Pierre Y, et al. The risk of recurrent anaphylaxis. *J Pediatr*. 2017;180:217-221.
- 7 Saleh-Langenberg J, Flokstra-de Blok BM, Goossens NJ, Kemna JC, van der Velde JL, Dubois AE. The compliance and burden of treatment with the epinephrine auto-injector in food-allergic adolescents. *Pediatr Allergy Immunol*. 2016;27:28-34.
- 8 Posner LS, Camargo CA Jr. Update on the usage and safety of epinephrine auto-injectors, 2017. *Drug Healthc Patient Saf*. 2017;9:9-18.
- 9 UK Government. Health and safety for school children. Available from: <https://www.gov.uk/health-safety-school-children>. Accessed June 2, 2018.
- 10 DeSantiago-Cardenas L, Rivkina V, Whyte SA, Harvey-Gintoft BC, Bunning BJ, Gupta RS. Emergency epinephrine use for food allergy reactions in Chicago Public Schools. *Am J Prev Med*. 2015;48:170-173.

Table 1. Primary and state school teachers' knowledge of the management of anaphylactic reactions. Only right answers have been included.

TYPE OF SCHOOL			
Total	Public school	State school	p
N=92	N=52	N=40	
N (%)	N (%)	N (%)	

What is the initial action to do in the event a serious allergic reaction?				
I call 061/112	70 (76.1)	42 (80.8)	28 (70)	0.35
Should children with serious allergies wear something alerting others to their allergy?				
Yes	55 (59.8)	33 (63.4)	22 (55)	0.36
What is the initial drug to be used in the event of a life threatening allergic reaction?				
Adrenaline	27 (29.3)	15 (28.8)	12 (30)	0.16
How should adrenaline be administered?				
Intramuscular	40 (43.5)	15 (28.8)	25 (62.5)	0.008
Is there an action plan to be used in the event of a serious allergic reaction in your school?				
Yes	66 (71.7)	34 (65.4)	32 (80)	0.17
Are the emergency medications to be used in the event of a serious allergic reaction available in your school?				
Yes	67 (72.8)	30 (57.7)	37 (92.5)	0.001
What is the correct order of actions to take in the event of a life threatening allergic reaction?				
He/she could make the correct order ^a	48 (51.2)	27 (51)	21 (52.5)	0.055

^aWhen the typical symptoms of anaphylaxis were identified, teachers called emergency services after (or not) administering epinephrine.