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School Board Policies on Prevention and Management of Anaphylaxis in İstanbul: Where Do We Stand?

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Background: Allergic diseases with a potential for anaphylaxis pose a critical public health issue in schools.
Aims: This study was carried out to identify the current status of prevention and management of anaphylaxis in school children with the main goal of establishing such an action plan.
Study Design: Cross-sectional study.
Methods: Schools were randomly selected from 11 different regions of Istanbul. A questionnaire was filled out by 2596 teachers/school principals from 232 public schools.
Results: A school safety committee was absent in 80% of elementary schools (ES) and 60.8% of preschools (PS). Although some form of health recording system was available in many schools, no such system was available in 24.5% of ESs and 10% of PSs. A specific inquiry for detecting children with food allergies was a routine practice in only 4% of ES and 10% of PS. Approximately 27% of teachers stated that monitoring children in school places was not possible at all times. Eighty four percent stated that no written anaphylaxis treatment protocol was available in their school and only around 2.3% in ES and 3.1% in PS stated that they would perform an epinephrine injection in the event of anaphylaxis.
Conclusion: Our survey demonstrated critical gaps in the organization of schools for the management of children at risk of anaphylaxis. Data derived from this study would provide the initiative for legislators to review the current situation of school health policies along with the relevant authorities to establish school anaphylaxis guidelines.
Keywords: Anaphylaxis, epinephrine, food allergy, school board policy

Anaphylaxis is a severe systemic allergic reaction that occurs immediately after exposure to an allergy-causing substance and can potentially lead to death. Food allergy is the most common cause of anaphylaxis occurring in community health settings, affecting 4-6% of children in the United States (1). In Turkey, the estimated prevalence of parental reported IgE-mediated food allergy was 5.7% (2). In general, childhood food allergies to milk, egg, wheat, and soy typically resolve during childhood, whereas allergies to peanut, tree nuts, fish, and shellfish are persistent (1). Allergen avoidance strategies are important for the prevention of anaphylaxis, which include scrutinize reading of food labels, and the elimination of all potential contamination risks.

Anaphylaxis requires the early recognition of symptoms and the prompt administration of epinephrine. Fatalities frequently occur away from home and are mostly associated with either not using or delaying the use of epinephrine. McIntyre et al. (3) reported that 24% of allergic reactions occur in individuals with no history of allergies and 19% occur in the playground or on field trips. Likewise, Sicherer et al. (4) reported that 25% of the children with a peanut allergy experienced their first attack in school. Several countries enacted legislation related to anaphylaxis in schools requiring the establishment of an anaphylaxis policy towards reducing allergen exposure, providing regular management training for school personnel, and establishing individual

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anaphylaxis emergency management plans (5-8). This legislative approach potentiated efforts for the implementation of a safer school environment. Meanwhile, there are significant gaps in the implementation of school anaphylaxis guidelines, even in those legislated states, especially with respect to the administration of epinephrine, usage of anaphylaxis emergency forms, and awareness of school procedures by school personnel (8).

In this study, we aimed to determine the current situation of availability of anaphylaxis guidelines in public schools including personnel's awareness and familiarity with them in a Metropolitan city of Istanbul. For this purpose, we conducted a survey to acquire information on: a) whether dedicated written school board anaphylaxis policies exist, and if so, what is the comprehensiveness of these policies; and b) what are the school personnel's perceptions regarding school management practices of anaphylaxis?

MATERIALS AND METHODS

This is a cross-sectional study carried out among elementary schools in 11 different regions of Istanbul from December 2012 to February 2013. Schools were randomly selected based on the number of students per teacher; those with <25 students per teacher are considered high socioeconomic, and those with more than 25 are considered poorly funded. To estimate the minimum sample size, the following formula was used: N=(1.96)2*0.25*(1527)/(0.05)2*1526+(1.96)2*0.25, where 1527 is the number of primary schools in İstanbul (population size) and the anticipated population prevalence was 50%. The equation then yields a sample size of 308. Simple random sampling is done by using the last 2 digits of a bill as the starting point and continued on from a random number table. In order to compensate for potential drop-outs, calls were made to 400 schools; among them, 232 schools responded to our call (75% of the desired sample size). The study was approved by the local ethical committee of Marmara University.

Data were obtained by using a multiple choice questionnaire consisting of 6 categories (presence of school board safety committees; identification of children at risk; observation of the students across various sites of the school; availability and location of epinephrine auto-injectors; and creating an allergy-safe school environment) to assess the current status and practices for the prevention and management of anaphylaxis in schools. Questionnaires also included the assessment of school staff on a) knowledge of food allergy and anaphylaxis, and b) school policies on the prevention and management of anaphylaxis. The participants who gave informed consent received the survey questionnaire. Statistical analyses were performed using the IBM SPSS Statistics for Windows, Version 20.0. (IBM Corp.; Armonk, NY). Descriptive analyses were applied to the variables of interest on the questionnaire.

RESULTS

The study questionnaire was completed by 2596 teachers/school principals from 232 public schools in Istanbul. Eighty-nine percent of the participants were from elementary schools (ES) and the rest were preschools (PS). The following results were provided according to their reports.

Eighty percent of ES and 61% of PS had no school safety committees and about 94% have no healthcare professionals employed in their school. Twenty five percent of ES and 10% of PS had no official system to keep health records of the students, and even if they have a system, only 4% of ES and 10% of PS, specifically inquire data on food allergy. Regarding students who were known to have food allergy, 79% and 90% of ES and 65.6% and 83% of PS participants denied any specific policies with respect to the notification of classroom teachers and food service managers on food allergy, respectively. In addition, 84% of all participants stated that their schools don't have any written instructions for anaphylaxis management.

Forty five percent of ES and 62% of PS participants stated that they knew some of the prominent symptoms of anaphylaxis but were unable to fully recognize it. Although, about half (55%) of the participants have taken a first aid training, correct responses regarding first aid for anaphylaxis were also low. Only 2% of ES and 3% of PS participants stated that they would immediately apply epinephrine, and about 94% of all stated they would do the first aid except for epinephrine. Fifty eight percent of the participants who have experienced an anaphylaxis incident, just called the emergency line without performing first aid. Even if they do know how to diagnose and manage anaphylaxis, an epinephrine auto-injector was available in only 1% of ES and PS.

About 27% of all participants stated that it is not possible to monitor all the students while in school. Allergy safe areas and customized allergen-free food service can be provided in 29% and 4% of ES and 47% and 20% of PS, respectively. Regarding transportation, 58% of ES and 31% of PS don't have "no eating policies" on school buses.

DISCUSSION

This study was carried out to identify the current status of the prevention and management of anaphylaxis in school children with the main goal of establishing such an action plan in

mind. Apart from the significant gaps in the organization of schools for the management of children with food allergies, defects were observed in the identification of children at risk and in the coordination between different school units, including transportation, playgrounds, cafeteria and even classrooms to provide allergen-safe places.

Schools have a legal obligation to protect the welfare of students while at school; therefore, they are obliged to support students at risk of anaphylaxis (9-11). Worldwide, many schools have implemented policies to improve the safety and management of school children with food allergies and anaphylaxis. These policies are based on the principles of food allergen avoidance, including the avoidance of food sharing and cross-contact, and preparedness with epinephrine. However, previous studies demonstrated that school personnel often lack the knowledge and skills necessary to recognize and treat anaphylactic reactions (12-14). Many schools did not provide their staff with education on how to prevent allergic reactions or respond to life-threatening events (4,15). Written student-specific emergency plans for staff to follow in the event of an allergic reaction were frequently not available or used, and in some cases, there was no physician's order or supply of epinephrine available in schools (4,15-17).

Various countries have mandatory school guidelines for the management of food allergies, whereas others are voluntary. It was reported that even in legislated environments, the actual implementation of school anaphylaxis policies has been suboptimal. Meanwhile, school boards in legislated environments have made greater efforts to support students at risk of anaphylaxis compared to non-legislated ones (14). On the other hand, a survey by Wu and Hill (18) found that 53% of schools in Indianapolis had no policy for the management of anaphylaxis and the remaining 47% had a policy that consisted only of calling 911.

School health services are provided by Population Health Centers under The Ministry of Health, Public Health Institution of Turkey. Regulations about school health are shared by the Ministries of Health and Education. Turkey joined The European Network of Health Promoting Schools in 1995, aiming to integrate health promotion by introducing healthy programs and practices into school's daily routines. Turkish laws state that during the registration for school, parents should disclose the allergic status of the child. Even if the schools were informed of allergies, about two thirds of the teachers stated that they do not have a policy to relay this information to the classroom teacher. In addition, this information is not processed any further. In 80% of ES and 60% of preschools, no school safety committee exists. Meanwhile, more than 90% of schools have no school nurse. In about 25% of ES, no institutional database exists on students' health status whatsoever, while there is barely any information in the rest.

It was previously shown that only about 10% of anaphylactic reactions occur in cafeterias, with the remainder happening mostly in the classroom (3,4). Our findings indicated that approximately 27% of the teachers were not confident about the monitoring of children in all areas while in school. In our country, there are regulations about the keeping of school canteens and hygiene rules to be complied. There is also a white flag project, aiming to integrate health promotion in school canteens and food services. Although practices of hygiene and food preparation, food storage and cleaning procedures are all covered, issues regarding food allergy are missing. As a partial solution to this issue, documentation of food allergy by health professionals as a life threatening event may enable those children to receive allergen-free diets in school.

When the information on food sharing during transportation to and from school is looked at, 31% of teachers in PS and 58% in ES stated that they have no such policy. In Turkey, regulations regarding school service vehicles include driver qualifications and vehicle standards, but not issues on "no food policy on the buses" or competency in handling anaphylaxis.

Although 55% of teachers reported having received first aid training, only about 3% felt competent in the application of epinephrine. Of note, the first aid does not involve the administration of any kind of medication, including epinephrine. Therefore, it seems crucial to provide epinephrine application training programs for the school personnel. Our survey revealed that the preparedness of schools for the management of anaphylaxis was in a very poor state. A written emergency action plan was reported to be lacking in 84%.

Nearly half of the teachers/principals stated that they would not recognize an anaphylactic reaction. Previous studies demonstrated that about 25% of allergic reactions occurred in individuals with no previous history of allergies (3,7). Thus, schools should also be prepared to recognize and treat anaphylaxis in individuals experiencing their first attack of anaphylaxis (9). In order to implement this, schools should have a supply of epinephrine on hand for such emergencies. However, current regulations regarding primary schools state that any prescribed medicine cannot be stored or used by the students at school. Thus, in the current study the availability of epinephrine auto injectors in schools was only 1%.

The present study included a random sample of size drawn only from İstanbul, and the response rate was 75%. Another limitation of the study is that only public schools were included. Although these limitations may have limited generalizability, İstanbul is the country's largest city. Previously, Ercan et al. (19) showed that elementary school teachers in Turkey are not well informed about anaphylaxis in a small sample. The

current survey further demonstrates the problem in both PS and ES health policies regarding the prevention and management of anaphylaxis in a larger random sample.

In conclusion, allergic diseases with a potential for anaphylaxis pose a critical public health issue in schools. The results of this survey uncovered the fact that there are no guidelines existing to meet the needs. Data derived from the current study would provide the initiative for legislators and policy-makers to review the current situation of school policies long with the relevant authorities and advisory committees to establish school anaphylaxis guidelines.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Marmara University.

Informed Consent: Written informed consent was obtained from participants who participated in this study.

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