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Conflict of Interest

Chang YS is the head of Gyeonggi-Do
Atopy-Asthma Education Information Center
which is supported by the Korean Disease
Control and Prevention Agency and the
Gyeonggi-do provincial government.

Gyeonggi-do Atopy · Asthma Education Information Center in Korea: a key partner in the Korean Asthma Allergy Program

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ABSTRACT

Allergic diseases such as asthma, allergic rhinitis, and atopic dermatitis are common and cause high socioeconomic burden. Allergic disease is a matter of not just for a patient, but also for a family and the society. The Korean government, the Korean Disease Control and Prevention Agency, started the nationwide asthma and atopic disease prevention and management plan in collaborations with the opinion leaders from the Korean Academy of Asthma, Allergy, and Clinical Immunology, and the Korea Asthma Allergy Foundation since 2007. Seoul Atopy · Asthma Education Information Center was established in 2008 by the Korean Disease Control and Prevention Agency and the Seoul metropolitan government to provide the reliable and accurate information on asthma and allergic diseases. In 2011, Gyeonggi-do Atopy · Asthma Education Information Center was established by the Korean Disease Control and Prevention Agency and the Gyeonggi-do provincial government. The activities of the center are as follows: (1) atopy · asthma-friendly school program, (2) development/distribution of the educational materials, (3) open lectures for the community, patients, their caregivers, older people, nurses, pharmacists, and doctors, (4) collaborations with the Korean Disease Control and Prevention Agency, the Gyeonggi-do provincial government, the office of education, and the public health centers, (5) collaborations with the Gyeonggi-do fire services to educate 119 rescue teams on the allergic emergency conditions, (6) international collaborations. In this article, 10 years of experience and achievement from the Gyeonggi-do Atopy · Asthma Education Information Center were described, especially on the atopy · asthma-friendly school program.

Keywords: Asthma; Allergy; Program; School; Education; Information

INTRODUCTION

Allergic diseases such as asthma, allergic rhinitis, and atopic dermatitis are not only common, but also cause high socioeconomic burden [1-3]. Food allergy and drug allergy are also increasing. Anaphylaxis is acute generalized severe life-threatening allergic reactions which need immediate action and treatment with epinephrine. Allergic disease is a matter of not just for a patient, but also for a family and the society. Asthma affects more than 339

million people worldwide [4]. In Korea [1], 1 out of 10–20 persons has asthma and 1 out of 3 has allergic rhinitis. Atopic dermatitis occurs in 1 out of 5 children and can occur in any age. Although we are flooded with information, the patients and families need the reliable and accurate source of information on allergic diseases.

The Korean government, the Korean Disease Control and Prevention Agency, started the nationwide asthma and atopic disease prevention and management plan in collaborations with the opinion leaders from the Korean Academy of Asthma, Allergy, and Clinical Immunology (KAAACI), and the Korea Asthma Allergy Foundation (KAF) since 2007 [5, 6]. In 2008, Seoul Atopy • Asthma Education Information Center was established by the Korean Disease Control and Prevention Agency and the Seoul metropolitan government to provide the reliable and accurate information on asthma and allergic diseases. The key opinion leaders including myself from KAAACI, KAF, and the Korean Academy of Pediatric Allergy and Respiratory Disease (KAPARD) were actively involved in the center. With the successful activities of the center, 3 years later, Gyeonggi-do Atopy • Asthma Education Information Center was established by the Korean Disease Control and Prevention Agency and the Gyeonggi-do provincial government in 2011 [7]. Gyeonggi-do province is the area surrounding Seoul and the most populous province with 13.5 million people in Korea. If the program became successful in the Gyeonggi-do province which consisted of both urban and rural area, the centers could be extended to the whole country. I have been serving as the head of the Gyeonggi-do Atopy • Asthma Education Information Center since its foundation. The main activities of the center are as follows: (1) atopy • asthma-friendly school program, (2) development and distribution of the educational and teaching materials, (3) open lectures and education for the community, patients, their caregivers, elderly people, nurses, pharmacists, and doctors, (4) collaborations with the Korean Disease Control and Prevention Agency, the Gyeonggi-do provincial government, the Gyeonggi-do province office of education, and the public health centers, (5) collaborations with the Gyeonggi-do fire services to educate 119 rescue teams on the emergency conditions such as acute asthma exacerbation and anaphylaxis, (6) international collaborations with the Finnish Allergy Program steering committee (Finland), the Allergy Pot (Japan), National Asthma Council (Australia), and so on. The activities have been presented at the various international congresses including the joint congress of the Asia Pacific Association of Allergy, Asthma, and Clinical Immunology and the Asia Pacific Academy of Pediatric Allergy, Respiratory and Immunology in 2018. It would be great to share the 10 years of experience and achievement from Gyeonggi-do Atopy • Asthma Education Information Center, especially the atopy • asthma-friendly school program in this article.

ATOPY • ASTHMA-FRIENDLY SCHOOL PROGRAM UNTIL 2011

As allergic diseases are common in children and they spend a lot of time at nursery and school, it is important to provide the friendly environment at nursery and school. Life-threatening conditions such as asthma exacerbation during activities or even anaphylaxis by school meals can occur [8-11]. A study showed school absenteeism associated with asthma and allergic diseases in Korea [12]. It is very important to increase the awareness of school nurses, teachers, and the staffs at school and nursery on allergic diseases.

In 2007, 3 primary schools in Gyeonggi-do province were enrolled as a preliminary project of ‘asthma-friendly school’ supported by the Korean Disease Control and Prevention Agency.

With the promising results from the study, the Korean Disease Control and Prevention Agency launched atopy · asthma-friendly school project with 18 schools since 2008. Next year, the number of atopy · asthma-friendly schools became 144 and the number has increased year by year.

ATOPY · ASTHMA-FRIENDLY SCHOOL PROGRAM IN GYEONGGI-DO PROVINCE SINCE 2011

In 2011, the number of atopy · asthma-friendly nurseries and schools was 177 (88 nurseries, 89 primary schools) in Gyeonggi-do province when the Gyeonggi-do Atopy · Asthma Education Information Center was established. We did survey on the educational demand on allergic diseases in the community [13]. After meetings with school nurses, principals, parents, and the administrators of the public health centers, I found that they had difficulties in implementing atopy · asthma-friendly school program although there was a manual from the Korean Disease Control and Prevention Agency. Just reading the manual was not enough for them as they did not know much about asthma and other allergic diseases. They also needed the educational materials according to the age groups although a series of educational booklets and materials had been provided by KAF and Seoul Atopy · Asthma Education Information Center under the support from the Korean Disease Control and Prevention Agency.

To increase the awareness on asthma and allergic diseases, the Gyeonggi-do Atopy · Asthma Education Information Center started ‘Atopy · Asthma Academy for School Nurses’ twice a year providing lectures on asthma, allergic rhinitis, atopic dermatitis, food allergy, and anaphylaxis. We also provided hands-on workshop on how to use salbutamol inhaler with spacer and epinephrine autoinjector. About 200 school nurses participated in ‘Atopy · Asthma Academy for School Nurses’ each time (Fig. 1A). The lectures were given by allergy specialists, mostly by professors of allergy specialty in Gyeonggi-do province. For the lectures, we provided the standardized teaching slides on asthma and allergic diseases to



Fig. 1. (A) ‘Atopy Asthma Academy for School Nurses’ providing lectures on asthma, allergic rhinitis, atopic dermatitis, food allergy, and anaphylaxis twice a year. We also provided hands-on workshop on how to use salbutamol inhaler with spacer and epinephrine autoinjector. About 200 school nurses participated each time. (B) Implementation of the atopy · asthma-friendly school program was full of fun with OX quiz, storytelling, plays, and other activities.



Fig. 2. Gyeonggi-do Atopy Asthma Education Information Center developed the various educational materials for younger primary school students, and for the nursery children as well as for any age group. All the educational and teaching materials were standardized and reviewed by the academies including the Korean Academy of Asthma, Allergy, and Clinical Immunology, and the Korea Asthma Allergy Foundation under the support from the Korean Disease Control and Prevention Agency.

the speakers. Besides, for initial 2–3 years, I tried to visit and give lectures at every meetings of school nurses. We also supported the educational sessions for school nurses who were working at remote area with a small group lectures in that area. It is very important to inspire the school nurses who are the key persons in the atopy · asthma-friendly school program.

To support the needs for the educational materials according to age groups, the Gyeonggi-do Atopy · Asthma Education Information Center developed the educational materials for younger primary school students, and for the nursery children as well as for any age group (Fig. 2). Before release, all the developed educational materials were standardized and reviewed by the academies including KAAACI and KAPARD in collaboration with the Korean Disease Control and Prevention Agency.

With the activities of Gyeonggi-do Atopy · Asthma Education Information Center, more and more school nurses got involved in the program. The program went viral once they knew that asthma and allergic diseases were very common at nursery and school and that the program was very helpful for their students. The number of atopy · asthma-friendly nurseries and schools has been dramatically increased: 177 in 2011, 353 in 2012, 415 in 2013, 463 in 2014, 534 in 2016, 640 in 2017, 656 in 2018, and 670 in 2019. In 2020, the number of the nurseries and schools were maintained as 633 (total of 145,215 children involved in the program) in spite of COVID-19 (Fig. 3).

IMPLEMENTATION OF THE ATOPY · ASTHMA-FRIENDLY SCHOOL PROGRAM IN GYEONGGI-DO PROVINCE

Many school nurses showed amazing capability in the implementation of the atopy · asthma-friendly school program. After studying the standardized educational/teaching materials at various educational sessions such as the atopy · asthma academy for school nurses, they

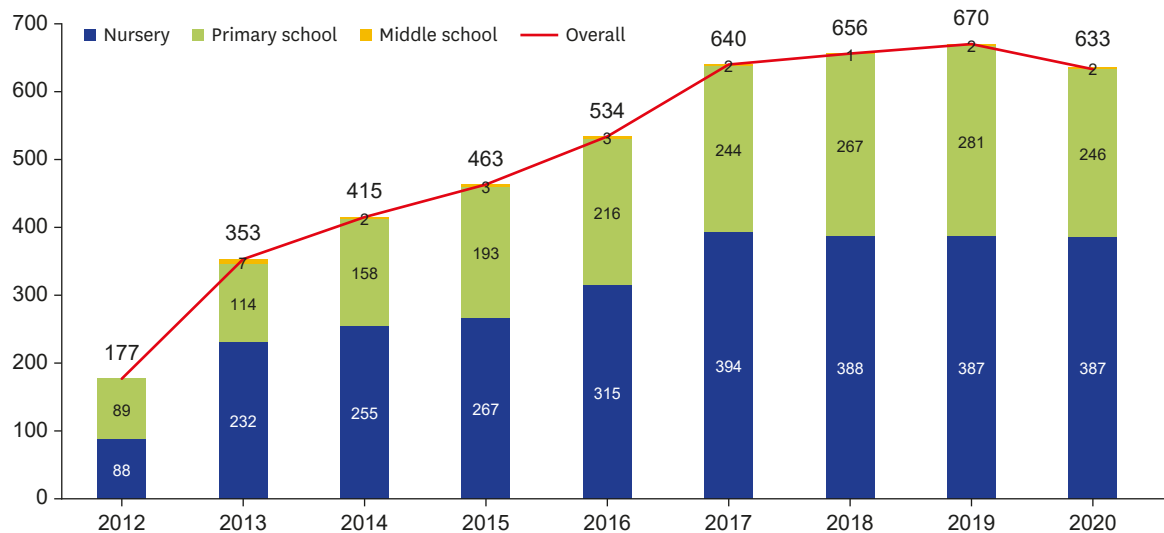


Fig. 3. The annual number of the atopy · asthma-friendly nurseries and schools in Gyeonggi-do province, Korea. In 2020, 633 nurseries/schools with 144,215 children were involved in the program despite of coronavirus disease-19 (COVID-19).

gave lectures for all of their students, other teachers, parents, and the caregivers at their school. They started to send the educational materials and information to the families with allergic diseases. They even started to put the course in the regular classes. They started to help students with allergic diseases, e.g., providing educational materials and action plans, emollients, and so on. They built up the students' organization to learn about allergic diseases with the standardized educational materials. They started to communicate with the nutritionists on food allergy at schools. They invited allergy specialists, and the educational nurses to give lectures at school and invited the parents, teachers, staffs at the lectures. I must say that school is the wonderful and core place for the community-based medicine.

Among the standardized educational materials, storytelling books, cartoons, and coloring books are very popular in younger primary school students and children at nursery. Some school nurses taught older students how to perform a small play for younger students with the storytelling books on allergic diseases. Implementation of the program was full of fun with OX quiz, storytelling, plays, and other activities (**Fig. 1B**).

At the initial phase of the project, the school nurses kept asking to make legislations allowing school nurses to administer epinephrine via autoinjector. Even though the epinephrine autoinjector was prescribed to use by the patient himself/herself or by the caregivers, they requested the protection by legislation. Fortunately, I could meet a congresswoman during my lecture on the activities of the Gyeonggi-do Atopy · Asthma Education Information Center, and she expressed great interest to help children with anaphylaxis. Since then, in many collaborations and with the supports from the opinion leaders of the academies, the legislation allowing school nurses to administer epinephrine via autoinjector that was kept under the permission from the parents was finally passed with the amended School Health Act in 2017.

School nurses keep sharing their experience and successful story that the program was very helpful for their students with asthma and allergic diseases. They could help children with acute asthma exacerbation because they knew how to use their salbutamol inhaler with spacer based

on the action plan. With the educational sessions, the awareness on the management also improved. The school nurses could help children in case of anaphylaxis with early recognition and the epinephrine autoinjector based on the action plan. The schools as well as the school nurses became more confident in their capability on the early recognition of urgent/emergent condition, and the management based on the action plan. They also shared their experience that many of atopic dermatitis children got very well with regular emollient application following the instructions in the standardized educational materials.

MEETINGS WITH THE SCHOOL PRINCIPALS AND THE GYEONGGI-DO PROVINCE OFFICE OF EDUCATION

The school principals are the leadership who manage the school policies including the school health programs and link the school nurses, teachers, and other staffs at school. It is essential to have a good communication with the school principals. The Gyeonggi-do province office of education is in charge of schools in the province and also the essential partner for the successful school health programs. The Gyeonggi-do province office of education regards the atopy • asthma-friendly school program as the best school health program in the province.

The Gyeonggi-do Atopy • Asthma Education Information Center have been meeting with the principals of the schools and the officers from the Gyeonggi-do province office of education at least once a year. It is quite an active and fruitful meeting with introducing the current status of allergic diseases and problems in their schools including lack of school nurses at some schools. Sometimes the Gyeonggi-do province office of education gives the solution. The center always listens and shares the updates, experience, and achievement. We learn a lot through this communication. It is also helpful to plan the next strategy for the schools.

COLLABORATIONS WITH OTHER ORGANIZATIONS

The 119 rescue team from the fire service could be the first medical personnel who arrives on the spot in cases of acute asthma exacerbation or anaphylaxis at school. It is very important to increase the awareness of 119 rescue team on the allergic emergency conditions. Gyeonggi-do Atopy • Asthma Education Information Center has been collaborating with the Gyeonggi-do province fire services and training the 119 team annually. A study showed the dramatic increase of the awareness on acute asthma exacerbation and anaphylaxis including the management after the educational session [14].

Gyeonggi-do Atopy • Asthma Education Information Center also provides the educational sessions for nurses, pharmacists, and doctors. As previously mentioned, allergic disease is not just a matter of a patient, but the society. We need a holistic approach.

Gyeonggi-do Atopy • Asthma Education Information Center has been collaborating with international organizations such as the steering committee of the Finnish Allergy Program (Finland), Allergy Pot (Japan), the National Asthma Council (Australia), AllerGen (Canada), and so on [15-17]. It is great to communicate each other and to know that we are doing the similar projects to increase the awareness on allergic diseases for the proper management and better outcome.

ACTIVITIES IN TIMES OF COVID-19

Because of coronavirus disease-19 (COVID-19), it was impossible to provide the face-to-face educational sessions in 2020. Instead, we prepared the online education modules and teaching materials. We provided the educational videoclips on asthma, allergic rhinitis, atopic dermatitis, food allergy, and anaphylaxis. Live streaming or recorded lectures were provided at schools via online using YouTube, zoom, and so on. For those who need hand-on workshop with the training kits, we provided the tool kits including the training kit of spacer (for acute asthma exacerbation training, 134 schools) and epinephrine autoinjector (for anaphylaxis training, 248 schools) together with the videoclips explaining how to use the training kits. The atopy · asthma academy for school nurses was successfully held 4 times via the online conferences with 565 school nurses. We could educate 10,667 doctors, medical students, and nurses via online conference. We also trained 417 members of 119 rescue team from 36 fire stations in the province. Feedback from all the participants was also nice.

CONCLUSION

The Korean government is providing a unique national asthma allergy program in the Asia Pacific region, and the world. Gyeonggi-do Atopy · Asthma Education Information Center is a key partner in the Korean Asthma Allergy Program. The Atopy · Asthma Education Information Center provides reliable information, educational resources, and programs for the patients, families, and community. While it was not easy task to run the Gyeonggi-do Atopy · Asthma Education Information Center, it became very popular year by year like a magic because of many people who made this possible. Currently, there are 7 Atopy · Asthma Education Information Centers (Seoul, Gyeonggi-do, Gyeongsangbuk-do, Busan, Gangwon-do, Gwanju, Daejeon) in Korea and more centers will be established soon. It is very important for the opinion leaders and allergy experts to be involved in the national asthma allergy program, which aims to increase the awareness on asthma and allergic diseases for the proper management and better outcome. International collaborations will also enhance mutual understandings, plans, and strategies.

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REFERENCES

1. Kang SY, Song WJ, Cho SH, Chang YS. Time trends of the prevalence of allergic diseases in Korea: a systematic literature review. *Asia Pac Allergy* 2018;8:e8.
[PUBMED](#) | [CROSSREF](#)
2. Song WJ, Kang MG, Chang YS, Cho SH. Epidemiology of adult asthma in Asia: toward a better understanding. *Asia Pac Allergy* 2014;4:75-85.
[PUBMED](#) | [CROSSREF](#)
3. Kim SH, Kim TW, Kwon JW, Kang HR, Lee YW, Kim TB, Kim SH, Park HW, Park SW, Chang YS, Cho YS, Park JW, Cho YJ, Yoon HJ, Cho SH, Choi BW, Moon HB, Min KU. Economic costs for adult asthmatics according to severity and control status in Korean tertiary hospitals. *J Asthma* 2012;49:303-9.
[PUBMED](#) | [CROSSREF](#)
4. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2017;390:1211-59.
[PUBMED](#) | [CROSSREF](#)
5. Kim YY. Past, present, and future of allergy in Korea. *Allergy Asthma Immunol Res* 2010;2:155-64.
[PUBMED](#) | [CROSSREF](#)
6. Korea Disease Control and Prevention Agency. Prevention and management of chronic diseases: Atopy asthma prevention management project [Internet]. Cheongju (Korea); Korea Disease Control and Prevention Agency; [cited 2021 Jan 15]. Available from: <https://www.cdc.go.kr/contents.es?mid=a20303020400>.
7. Gyeonggi-do Atopy Asthma Education Information Center [Internet]. Seongnam (Korea): Gyeonggi-do Atopy Asthma Education Information Center; [cited 2021 Jan 15]. Available from: <https://e-allergy.org>.
8. Harris K, Kneale D, Lasserson TJ, McDonald VM, Grigg J, Thomas J. School-based self-management interventions for asthma in children and adolescents: a mixed methods systematic review. *Cochrane Database Syst Rev* 2019;1:CD011651.
[PUBMED](#) | [CROSSREF](#)
9. Esty B, Permaul P, DeLoreto K, Baxi SN, Phipatanakul W. Asthma and allergies in the school environment. *Clin Rev Allergy Immunol* 2019;57:415-26.
[PUBMED](#) | [CROSSREF](#)
10. Korematsu S, Fujitaka M, Ogata M, Zaitsumi M, Motomura C, Kuzume K, Toku Y, Ikeda M, Odajima H. Administration of the adrenaline auto-injector at the nursery/kindergarten/school in Western Japan. *Asia Pac Allergy* 2017;7:37-41.
[PUBMED](#) | [CROSSREF](#)
11. Greenhawt M, Shaker M, Stukus DR, Fleischer DM, Hourihane J, Tang MLK, Abrams EM, Wang J, Bingemann TA, Chan ES, Lieberman J, Sampson HA, Bock SA, Young MC, Wasserman S, Mack DP. Managing food allergy in schools during the COVID-19 pandemic. *J Allergy Clin Immunol Pract* 2020;8:2845-50.
[PUBMED](#) | [CROSSREF](#)
12. Kim SH, Sohn KH, Kang SY, Kim JH, Kwon JW, Na JI, Kim BK, Chang YS, Cho SH. School absenteeism associated with asthma and allergic diseases in Korean school-aged children. *Pediatr Allergy Immunol Pulmonol* 2018;151-7.
[CROSSREF](#)
13. Jo EJ, Kim MY, Jeon Y, Kwon JW, Na JI, Kim SH, Rhee CS, Cho SH, Min KU, Chang YS. Educational demand on allergic diseases from 45 public health centers in Gyeonggi-do. *Allergy Asthma Respir Dis* 2013;1:55-9.
[CROSSREF](#)
14. Seo B, Lee SH, Yang MS, Lee SH, Kim SH, Cho SH, Chang YS. 119 Rescue team's awareness of anaphylaxis and asthma exacerbation in Gyeonggi-do province of Korea: Before and after education. *Allergy Asthma Respir Dis* 2019;7:199-205.
[CROSSREF](#)
15. Haahtela T, Valovirta E, Bousquet J, Mäkelä M; Allergy Programme Steering Group. The Finnish Allergy Programme 2008-2018 works. *Eur Respir J* 2017;49:1700470.
[PUBMED](#) | [CROSSREF](#)
16. Haahtela T, Herse F, Karjalainen J, Klaukka T, Linna M, Leskelä RL, Selroos O, Reissell E. The Finnish experience to save asthma costs by improving care in 1987-2013. *J Allergy Clin Immunol* 2017;139:408-14.e2.
[PUBMED](#) | [CROSSREF](#)
17. Haahtela T, Tuomisto LE, Pietinalho A, Klaukka T, Erhola M, Kaila M, Nieminen MM, Kontula E, Laitinen LA. A 10 year asthma programme in Finland: major change for the better. *Thorax* 2006;6:663-70.
[PUBMED](#) | [CROSSREF](#)