

Detecting Asthma in Schools

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Asthma is a disease that affects approximately 5% of the Spanish population¹ and generates consumption of health care resources that accounts for between 1% and 2% of the annual budget of the Ministry of Health and Consumer Affairs.² Between 40% and 60% of this cost is attributable to loss of work time,^{3,4} that is, absenteeism, disability, early retirement, and premature death.² There is evidence that early treatment of the disease from childhood, with adequate preventive and anti-inflammatory medication—inhaled corticosteroids and perhaps even chromones—results in fewer hospitalizations and emergency room visits and improvement in severity index scores and even in resting lung function values.⁵ It has been estimated that nearly 70% of the total cost of the disease is attributable to poor control and management.² Early identification of the asthmatic will therefore doubtless modify the natural history of the disease.⁶

Early detection of a chronic disease benefits not only the patient (by allowing treatment to be initiated in early stages and various preventive measures to be taken that will modify the progression of the disease), but also benefits public health by reducing and optimizing the use of health care resources.

Early diagnosis of asthma in childhood is not easy. The various prevalence indices are dependent on the sample selected and on factors peculiar to the research design and diagnostic tools (questionnaires, interviews, or tests). In addition to establishing prevalence, it is important to recognize the factors that determine the continuation of childhood asthma into adulthood, as not all children diagnosed with asthma will continue to suffer from the disease as adults. As de Diego⁷ has explained well, such factors include age at which the disease appears, onset and duration of symptoms, lung function, clinical severity, and degree of bronchial hyperreactivity; other factors, such as atopy and sex, may be related to these and may be less important. These and other variables must be considered in the early detection of asthma, especially when it has not yet manifested clinically.

We can consider 3 interesting and very different aspects of the relation between asthma and school. Firstly, asthma, which is the fourth cause of work absenteeism, is also the first disease-related cause of school absenteeism. Absenteeism is an important factor in increasing health care costs in adults and is responsible for a considerable loss of activity in schoolchildren. It is a major factor in children's relationships to the school, to their classmates, and to their education in general. Children with asthma—especially girls and younger children—lose between 2 and 5 more days of classes than those without the disease.^{8,9} The second aspect of the relation between the school and asthma comes as a result of the contact between asthmatic children or adolescents and other children and their own introspection about their condition. Asthma affects quality of life and contributes to the development of disturbances in self-concept. This is a recent perspective and a holistic one of the self that involves skills, self-image, and self-esteem. In a study by Borrego et al⁹ a group of 97 children presenting active symptoms were compared with other children and a significant correlation was found between the presence of asthma and absenteeism, and self-concept scores showed a significant relation between the presence of asthma and success at school, physical appearance, behavior, and self-esteem. It is interesting to note that in the same study no positive statistical relation was found between asthma and social acceptance or athletic performance. This is a very interesting finding, as it brings us to the third aspect, which relates asthma to the physical education class.

Spanish Ministerial Order of July 10, 1995 (published in the Official State Bulletin [BOE] dated July 15) obliges physical education instructors to adapt the curriculum to pupils with special educational needs associated with motor or sensory disabilities, whether temporary or permanent, when so requested by pupils or their guardians and accompanied by the appropriate medical certificates. This measure was designed to ensure that physical education and sports would favor personal development. For some time now, the national institutes of physical education, where future physical education teachers are trained, have been receiving information and resources on asthma and other chronic diseases in order to improve the quality of life and favor the development of affected children. I recommend the document entitled "Asthma and Schools" published by

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the Department of Health of the Autonomous Community of Madrid.¹⁰ By raising awareness of asthma through the school and through education on the importance of adherence to treatment and preventive measures, spectacular results can be obtained in reducing school absenteeism due to asthma. A report from the Centers for Disease Control and Prevention showed that over an 18-month period emergency department visits decreased from 34% to 16% and school absenteeism decreased from 23% to 8% among children whose asthma was controlled.¹¹ We also know that asthmatic children and adolescents benefit from the practice of games and sports for many reasons related to their health, their disease, and their personal development.¹²

This issue, however, may be beyond the scope of this editorial on diagnosing asthma in the school, and may be more suitably left for a future review article.

For all these reasons, we call on teachers, who are in contact with children, to help us diagnose asthma early on. To a certain extent, they are already working with us. It is common for patients to be referred by the school or extracurricular sports programs because they have experienced wheezing, cough, or even shortness of breath while engaging in exercise. In competitive sports, it is not uncommon for coaches of players aged from 12 through 18 years (from children's leagues through the first or second divisions of youth leagues) to bring players with these symptoms to our attention when they change categories. A league change demands a higher level of physical effort, as there is an increase in the intensity of activities, in the speed of games, and in the duration of exercise. This stimulates the child's asthma, which has heretofore remained stable. The child has not yet had time to adjust to the new demands and is pushed over the threshold toward an asthma crisis. It is true that the number of such cases is small, but enough for us to identify a few with latent asthma that somehow only manifests itself with exercise. Perhaps they belong to those 12% to 13% of asthmatics who have not yet been diagnosed.¹³

Is there any better place than the school to apply a simple test to identify asthmatics? The use of an instrument or test for measuring physical fitness as a way of identifying those individuals with as yet undiagnosed asthma has been proposed, even though it may be more useful to use questionnaires on the signs and symptoms associated with the disease, such as those of the European Community Respiratory Health Study¹⁴ or the International Study of Asthma and Allergies in Childhood,¹⁵ which are already being used by Spanish investigators,^{1,16} or other similar ones we apply to evaluate children with asthma, including the knowledge they, their families, and their friends have of the disease.¹⁷ It is not in vain that such questionnaires are used as a reference method when, for one reason or another, bronchial challenge tests, such as exercise tests, are administered to determine the prevalence of bronchial hyperreactivity. Along these lines, Baradagi et al¹⁸ used a free running test to determine the prevalence of asthma in a child population. Later, the detection of

exercise-induced asthma, this time in the laboratory, was used to identify hyperreactive individuals. The results made it possible to distinguish those who were hyperreactive but had not been diagnosed with asthma.¹⁹ Exercise testing has also shown that children who are asymptomatic but with positive tests for bronchial reactivity to exercise are at higher risk for developing symptoms of dyspnea in the future.²⁰ However, the predictive value of exercise testing is low, as has been shown in other groups of subjects.²¹

From a practical point of view, the hypothesis that exercise testing would be useful seems to be correct, although it is based on assumptions that are not solid enough to support it. A hypothetically ideal exercise challenge test for use in schools would indeed determine bronchial hyperreactivity to exercise, but this is not always asthma. Asthma and hyperreactivity are not the same.²² Moreover, not all asthmatics exhibit exercise-induced asthma. The sensitivity of exercise testing is low and, in any event, the hyperreactivity detected may be due to diseases other than asthma. One methodological problem is that the test must be reproducible, reliable and sensitive, and should not take up too much class time. The instrument used to measure lung function variation should also be easy, convenient, robust, and sensitive. Peak flow meters are ideal, although they have their limitations—they are effort dependent, and depending on their characteristics, may be subject to measurement errors over time.²³ Of course, if we leave it to physical education teachers to identify children with asthma by the subject's signs and symptoms during the test, they may confuse these signs and symptoms with sensations of dyspnea or respiratory effort from other causes (cardiocirculatory, hematologic, metabolic, or even physical) and conclude a child has asthma before the child has seen a doctor.²⁴ This is not too serious, but simply confusing. Indeed, it would be very useful if, thanks to this hypothetically ideal test, we could attend to individuals with this problem.

In this issue of ARCHIVOS DE BRONCHONEUMOLOGÍA a very interesting study²² shows that the test most often used in schools to determine physical fitness level is not useful for detecting asthma in this setting. There are several reasons for this. Firstly, the Leger or shuttle run test²⁶ is progressive (with increases in speed each minute until maximum sustainable effort is reached); it usually lasts a maximum of 12 minutes. This means that individuals undergoing the test are exercising over 75% to 85% of predicted maximum performance level for a maximum of only 4 minutes, rather than the 7 to 10 minutes that they should remain in this zone. For this reason, the only asthmatics, or rather the only hyperreactive individuals, whether diagnosed or not, who will respond will be those who have a high degree of sensitivity because their condition is poorly controlled (because there is a period of inflammation or instability, or some other unknown reason is acting). Thus, the test does have limitations, especially given the physical fitness level of our population. Our youth's physical condition and state of health are better than

they were some years ago, thanks to improvements in such factors as nutrition, hygiene, and public health care,¹⁵ but while our young people are healthier, they are also less active. When these children are followed over several years, it can be seen that their weekly calorie expenditure and their exercise capacity are lower compared to children of the past.^{27,28} As a result, their exercise level is even lower when tested; during the test, the level of hyperventilation required to adjust to the physical effort will also be lower, and it will do little to contribute to the loss of heat and water from the airways that leads to the symptoms of exercise-induced asthma. In any event, as has been mentioned above, shortness of breath can be perceived by many individuals, not only those with asymptomatic asthma. Those unaccustomed to exercising at maximal capacity for a short period of time will also experience it.

The idea of having simple tools that would help us detect undiagnosed diseases in large groups of individuals is an appealing one. For asthma, detecting exercise-induced asthma this way does not seem to be the road to follow. In any case, as can be deduced from the study by Oñate et al²⁵ in this issue, we would need a test specifically conceived for the purpose, using an appropriate method and, I might add, conducted under the supervision of an asthma specialist.

The school has much to offer a child with asthma or other diseases. Its mission of facilitating the individual's educational, physical, and personal development means offering the resources needed for children with chronic diseases to feel like others and to adapt, as far as possible, to their own needs and to those of society. We are moving in this direction thanks to specialized courses, to graduate and doctoral programs offered by the institutes where physical education teachers are trained, and to the advice and support offered by associations and organizations involved in this field. There is only one road: that of knowledge, education, and prevention. Our aim must be to continue offering support to teachers in their efforts to learn about everything that might contribute to the full development of children with asthma, to their quality of life, and to the alleviation of their condition.

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