MANIFESTATIONS OF ALLERGIC DISEASES AMONG THE POPULATION IN INDUSTRIAL PRODUCTION AREAS

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Abstract: Assessment of the role of negative effects on the human body caused by environmental pollution is the most important task of medicine and has not only medical, but also social significance. This task is of particular importance for pediatrics, which deals with a growing organism that is sensitive to any environmental influences. Among the reasons that have a negative impact on the health of the population, it was revealed that the environmental component exceeds 20 percent.

Keywords: allergic rhinitis, bronchial asthma, atopic dermatitis, children's, industrial production area

The International Study of Asthma and Allergies in Childhood Phase Three (ISAAC-III) is used to examine the changes in the prevalence of symptoms of allergic disorders. Most of the ISAAC-III studies revealed an increase in the burden of allergic diseases allergic diseases mostly in developing countries [1].

In ISAAC-III, risk factors had been explored using an environmental questionnaire. Many factors, including paracetamol, antibiotics, and truck traffic exposure have been explored [2-4]. Environmental changes, western style, living

conditions, and rapid industrialization without proper planning may play a role in the increased prevalence of allergic symptoms [5-7] although this has not been proven yet. In this study, we aimed to determine the prevalence of asthma and other allergic diseases in an industrial area. In order to avoid randomization bias, only children in a certain area were included in the study group.

Material and methods. All patients and volunteers who participated in the scientific and clinical research gave written voluntary informed consent to this, and the study was performed in accordance with the requirements of the Helsinki Declaration of the World Medical Association (in 2013 edition)

Study Population. Our study was done in the Kemalpaşa district of Izmir, Turkey. Kemalpaşa is the major industrial region of Izmir, which is the third largest city in Turkey. There are 5 elementary schools in the district center. The total number of students aged 13-14 was 1511. All students in the target age group were included in the study.

Questionnaires and Definitions

First, researchers gave a brief presentation on allergic diseases to all teachers and students. Then all students were given the ISAAC Phase One questionnaire. The questionnaires were completed by the children themselves. The severity of asthma symptoms was assessed by questions dealing with the last 12 months. Symptoms that were asked about included number of wheezing attacks, sleep disturbance due to wheezing, and severe wheezing that limits speech to only one or two words at a time between breaths. If a student answered the question "Have you had wheezing or whistling in the chest in the past 12 months?" as "yes", then s/he was considered to have asthma (current wheezing). If a student answered the question "Have you ever had wheezing or whistling in the chest?" as "yes", then s/he was considered to have asthma (ever wheezing). "Ever rhinitis" was defined as a positive response to, "Have you ever had a problem with sneezing or a runny or blocked nose when you (he/ she) did not have a cold or the flu? "Current rhinitis" was defined as a positive response to "In the past 12 months, has your child had a problem with sneezing or a runny or blocked nose when he/she did not have a cold or the flu? Patients with symptoms occurring only between March and October were classified as having "seasonal rhinitis". When the symptoms were reported as occurring beyond the March–October period, the classification was "perennial rhinitis." Current allergic rhino conjunctivitis symptoms were evaluated as ''positive'' if both of the following questions were answered by the parent as ''yes'': ''In the past 12 months, has your child had a problem with sneezing or a runny or blocked nose when he/she did not have a cold or the flu?'' and ''In the past 12 months, has this nose problem been accompanied by itchy watery eyes?'' Similarly, symptoms for current eczema were studied on the basis of positive answers to two questions: ''Has your child had this itchy rash at any time in the past 12 months?'' and ''Has this itchy rash at any time affected any of the following places:

folds of the elbows, behind the knees, in front of the ankles, under the buttocks, or around the neck, ears, oreyes.''

Ethical Considerations

Permission for the study was obtained from the local ethics committee, and the central and provincial directors of the Ministry of Education and town governors. Written consent was obtained from each participant.

Statistical analysis

The SPSS-15 statistical software package (SPSS, Inc., Chicago, IL) was used for the analysis. Statistical analysis included frequency and percent distributions, calculation of prevalence rates for allergic diseases, and comparisons using chi-square and Student's t-tests.

Results. 1373 (90.8%) students were given the ISAAC Phase One Questionnaire. None of them declined to participate in the study. Questionnaires could not be given to those students who were not at school on the day of data collection. Of the 1373 students, 47.8% had an allergic symptom. The prevalence of asthma, rhinitis and eczema was 34%, 37% and 11%, respectively.

Gender

There was a slight majority of girls (698, 50.5%). Allergic symptoms were seen in girls more frequently (58.4%) than boys. This difference was significant ($p<0.05$). In the asthma group, 60% of the children were girls. Girls represented 65% of the rhinitis and 69% of the eczema groups. Gender difference for all groups was significant ($p<0.05$). In case of co-existing allergic problems, the percentage of girls was significantly more than that of boys ($p<0.05$).

Asthma

The frequency of symptoms related to asthma is shown in Table 1. The ISAAC Phase One questionnaire revealed ever wheezing (EW) in 34%, and current wheezing (CW) in 31.1% of the study group. In both wheezing groups, there were significantly more girls than boys ($p<0.05$).

Table 1

Frequency of asthma-related findings

Findings	n (%)
Ever Wheezing	468 (34)
Current Wheezing	428 (31.1)
Number of attacks	
1-3	67 (4.8)
4-12	24 (1.7)
> 12	68 (4.9)
Wheeze disturbs sleep	
Never	89 (6.4)
Less than once a week	42 (3.0)
More than once a week	29 (2.1)
Severe wheeze limiting speech	117 (8.5)
Physician-diagnosed asthma	57 (4.1)
Physician-diagnosed allergic bronchitis	168 (12.2)
Exercise wheeze	256 (18.6)
Night cough	278 (20.2)

Source: own study.

Rhinitis

The frequency of ever rhinitis was 36.6%, current rhinitis was 31.3%, current allergic rhino-conjunctivitis was 22.1%, physician-diagnosed allergic rhinitis was 11.1%, seasonal rhinitis was 8.8% and perennial rhinitis was 1.3%. Both in the seasonal and perennial rhinitis groups, girls represented more than 60% of the group.

Eczema

The frequency of ever eczema was 11.3% and that of physician-diagnosed eczema was 3.6% (Table 2).

Table 2

Frequency of eczema-related findings

Finding	n (%)
Ever eczema	156 (11.3)
Current eczema	81 (5.8)
Site of itchy rash	
Folds of the elbows	37 (2.6)
Behind the knees	33 (2.4)
In front of the ankles	30 (2.2)
Neck	40 (2.9)
Around the ears	15 (1.1)
Around the eyes	21 (1.5)
Rash disappearing during the last 12 months	74 (5.4)
Sleeplessnes due to rash during the last 12 months	
Never	64 (4.6)
< one night a week	25 (1.8)
≥one night a week	13 (0.9)
Physician-diagnosed eczema	50 (3.6)

Source: own study.

Discussion. The prevalence of rhinitis and eczema in our study was consistent with other ISAAC studies that were done in the same region [8]. However, asthma prevalence was found to be higher.

Before SAAC different centers had used different methods so the findings were not comparable between centers. To counter this problem, ISAAC formulated a questionnaire for the purpose of allowing international comparisons of asthma prevalence and severity. For this reason, ISAAC is very important and is widely utilized [7-10].

In Turkey, the first ISAAC Phase One study was done in 1995 and CW prevalence was found to be 9.8% and EW 15.1% (11). In 1999, the first ISAAC Phase Two study revealed 11.5% CW and 6.9% physician-diagnosed asthma (12). During the same period, EW prevalence was found to be 21.2%, asthma 6.4%, rhinitis 13.6% and eczema 23.7% in the Aegean region, in which Kemalpaşa is located [8]. A number of studies have found similar figures in this region.

CW prevalence was between 14.7-15.9%, rhinitis prevalence was between 14.5-46% and that of eczema was between 7.2-9-6% [13-15]. Although EW, rhinitis and eczema were as frequent as in the other studies in the same region, CW was far more prevalent, as high as two fold.

The question here is what was the reason behind the high prevalence of CW?''. This is what makes us think that environmental factors are the cause of this high prevalence of CW. Being an area of heavy industry results in migration, crowded households air pollution and low income.

While allergic diseases have had a tendency to increase in industrialized countries, the rate of increase has been slowing down recently [16-18].

The first ISAAC Phase Three study in Turkey revealed an increase in the prevalence of both EW (from 15.1% to 25.3%) and CW (from 8.2% to 11.3%). Family history of asthma, eczema and food allergy diagnosed by a physician, were associated significantly with high risk for asthma [19]. Unlike this study, our study revealed the importance of environmental factors, as in some other developing countries [20].

Since Kemalpaşa is an industrial area, there has been rapid urbanization in the recent years. The lifestyle and environmental changes associated with urbanization are crucial factors in determining the prevalence of allergic diseases in developing countries. For example, in China, marked differences have been observed in the prevalence of asthma between rural and urban communities. The prevalence of asthma symptoms in adolescents living in urban Beijing was six- to ten fold greater than that of outlying rural communities [21]. Similar findings have been observed in another study conducted in Africa, in which the rate of exercise-induced asthma was 50-fold higher in urban communities than in rural ones [22].

When we evaluate asthma data, both the number and the severity of the attacks were high (Table 1). In developed countries, although there is an increasing tendency for current wheezing prevalence, the prevalence of severity is decreasing. On the other hand, there is an increase in the severity of symptoms in developing countries [23].

There is a growing amount of evidence that air pollution may aggravate asthma. The level of particles, however, could not explain the regional differences [24]. The high frequency of allergic diseases in our study may be due to air pollution, since Kemalpaşa is a dense industrial area. There are studies showing the relationship between air pollution and asthma prevalence [25, 26].

Although air pollution has not been shown to be a risk factor by ISAAC studies, truck traffic exposure was described as a risk factor in developed countries. ISAAC Phase Three revealed a positive association among truck traffic density on the street of residency and asthma, rhino-conjonctivitis and eczema symptom frequencies [4]. Kemalpaşa also has traffic pollution, but we did not have any regular air pollution data. This was one of the major limitations of our study.

All allergic diseases were more frequent in girls. Similar findings were reported from Israel [7]. Asthma symptoms were reported to be more frequent among females in a study involving 4 countries: Australia, England, Germany and

New Zealand [27]. These findings are in accordance with studies showing a male predominance for wheezing during the first decade of life, which is reversed around the time of puberty [28]. The high prevalence of allergic diseases in girls may be caused by environmental factors, rather than atopy, in which there is a male dominance.

Conclusion

In conclusion, we have included the whole population of children in the 13-14 age group in a certain area and were able to determine the prevalence of allergic diseases. When compared with neighboring areas, there were no differences in rhinitis and eczema prevalence; asthma was seen more frequently, and this was considered to be related with the industrialization of the district. There are some environmental factors, the effects of which have not been clearly identified, which require further investigation.

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