

Knowledge and Attitudes of Adolescents towards Asthma: Questionnaire Results before and after a School-Based Education Program

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Key Words

Education · Adolescents · Asthma

Abstract

Background: Previous studies on school-based education programs have reported that asthmatic and nonasthmatic adolescents, teachers and school personnel do not have enough information on asthma. However, the number of education programs including adolescents without asthma is not sufficient. The aim of the present study was to determine the knowledge of school children about asthma and to investigate whether their knowledge of asthma can be increased by an education program through a booklet distributed as a handout. **Methods:** This cross-sectional prospective questionnaire survey was carried out in a private school in Ankara, Turkey, between February and April 2006. 720 adolescents in grades 6, 7 and 8 were included. Knowledge about asthma was evaluated by a scoring system before and after the education offered by means of a booklet. **Results:** The final analysis was conducted on 642 students in total. The number of right answers in 5 categories, percentage of right answers and total questionnaire score improved significantly after the education received ($p < 0.001$). The total questionnaire scores of the girls ($p = 0.002$), those students with a university graduate mother ($p = 0.006$) and those with a physician parent ($p = 0.041$) were higher than those of the other pupils. **Conclusion:** Theoretical material in the form of a booklet can be used in a school-based asthma education program in order to improve the knowledge of adolescents about asthma.

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Introduction

Epidemiologic studies reveal that approximately 10–20% of school-age children suffer from asthma [1, 2]. Students with asthma experience limitations with regard to their daily school activities, attendance and participation in games and sports activities [3, 4]. Nearly half of them will experience an asthmatic attack at school [2, 5]. On the other hand, there are no doctors or nurses in many schools. Therefore, teachers, school personnel and peers may have to take responsibility for recognizing and managing symptoms appropriately. Previous studies on school-based education programs reported that asthmatic and nonasthmatic adolescents [6–9], teachers [9–13] and school personnel [14, 15] do not have enough information on asthma and its treatment. In this respect, education of society, especially of teachers and school-age children, is as important as education of the patient and the patient's parents [16]. However, it was shown that education of school teachers did not positively affect adolescents with asthma [17]. Surveys suggest that peers may have a greater influence on a young person's health behavior than parents or health staff do [9, 18–20] as adolescents prefer to get information or receive a message about themselves from the peers they trust [21]. However, the number of education programs including adolescents without asthma is not sufficient [2, 8, 22]. Although there are a few reports on education of school children with asthma, there is still no study involving the education of healthy peers of asthmatic school children in Turkey.

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Therefore, the present study aimed to determine the knowledge of school children about asthma and to investigate whether this knowledge can be enhanced by education in the form of a booklet.

Materials and Methods

Study Participants

This cross-sectional prospective questionnaire survey was carried out in a private school in Ankara, Turkey, from February to April 2006. A total of 720 adolescents in grades 6, 7 and 8 were recruited for the study. Permission to perform the study was obtained from the school administration and the Ankara Directorate of the Ministry of National Education. Written informed consent was obtained from the parents of all students before the first test.

Survey Plan

An information form about the survey/questionnaire was sent to the families of the students in order to inform them fully about the study to be conducted as well as to obtain their informed consent before the study was carried out. Those who submitted their informed consent forms – signed and enveloped – sent them to the school administration, and these forms were collected and kept by the administration.

Initially, during the first visit, all students filled out a form related to the demographic and socioeconomic status of their family. The students were also asked whether they had any knowledge about asthma and, if so, where they had obtained this knowledge. Then they were given a questionnaire to assess their knowledge on asthma. The questionnaires were completed in the classrooms while the teachers were with the students as observers. Next, the booklets including the information about asthma and its treatment and the answers to the questionnaire were distributed to each student. Finally, a week later, the same questionnaires were given to the students and completed in the same way again. The improvement/change in the students' knowledge about asthma was evaluated by a scoring system.

The Booklet

The booklet had been prepared by the Pediatric Allergy Department of Gazi University, and it covers the following topics: general information about asthma, the signs and symptoms of asthma, asthma attacks and their triggers, treatment of asthma, asthma and sports and the attitude towards asthma at school. All the information in the booklet was discussed by the students with their classroom teachers. Whether the level of the language in the booklet was appropriate for the cognitive level of pupils in grades 6, 7 and 8 was then evaluated. Necessary corrections were made and the booklet was given its final form.

The Questionnaire

A self-administered questionnaire which included topics on general information about asthma, the signs and symptoms of asthma, asthma attacks and their triggers, treatment of asthma, asthma and sports and asthma in schools was prepared (Appendix). The questions were selected from questionnaires used in various surveys to assess the knowledge of school staff, teachers and

adolescents about asthma [2, 6–13, 22–24]. The questions in these studies were analyzed in detail and the ones appropriate for the level of these pupils in grades 6, 7 and 8 were selected; the language in the questions was revised in such a way that these pupils would not be confronted with any misleading meanings whatsoever. Necessary corrections were made and the questionnaire was assessed and finalized with the support of the pupils' classroom teachers; then the questions were revised in accordance with their views.

There were a total of 29 question items and 67 subtitles, each of which had 3 answers, worded as 'correct', 'incorrect' and 'I don't know'. Thirteen of the questions were about asthma in general (23 subtitles), 4 questions regarded symptoms of asthma (22 subtitles), 2 questions were on asthma treatment (4 subtitles), 5 questions were on asthma and sports (10 subtitles) and 5 questions dealt with asthma and school attitude (8 subtitles). The participants were thus asked 67 questions in 5 categories (Appendix, Q1–Q5).

Outcome Measurement

The primary outcome measure was the change in the total score on the questionnaire after education had been received. One point was given for each correct answer. If the student answered incorrectly or checked 'I don't know' for the question, no points were given. The maximum score for each category was 23 for general asthma knowledge, 22 for asthma symptoms, 4 for asthma treatment, 10 for asthma and sports and 8 for asthma and school attitude. The total questionnaire score was calculated by adding the scores for the 5 categories, giving a maximum score of 67. In addition, the percentage of correct answers (the success rate) was compared before and after the education. In this assessment, the success rate was categorized as poor if <30%, moderate if between 30 and 69% and satisfactory if $\geq 70\%$ [25].

Statistical Assessment

The data analysis was conducted using the program SPSS 11.5 (SPSS Inc., Chicago, Ill., USA). Continuous variables are shown as means $\pm$ standard deviation or median (range), as appropriate. Categorical variables are given as percentages. McNemar's test was used to assess the proportion of correct answers for each question before and after the education. Comparisons of the scores obtained before and after the education were evaluated applying the Wilcoxon signed-rank test. Whether the median differences between groups were statistically significant or not was analyzed by the Mann-Whitney U test. A p value less than 0.05 was considered statistically significant.

Results

Demographic Characteristics

A total of 720 adolescents in grades 6, 7 and 8 were recruited for this study. The students who did not write their names and/or the ones who did not fill out the demographic data on the inquiry form were excluded from the analysis. Only children who participated in both pre- and posteducation questionnaire sessions were included in the final analysis. In short, 78 students were excluded from the study, and thus 642 students were included in

Table 1. Demographic characteristics of the study population

Age, years	11.99 ± 0.46
Females	305 (47.5)
Males	337 (52.5)
Asthma present	16 (2.5)
Total income, EUR/month (range)	2,000 (600–2,000)
Siblings	
No siblings	215 (33.5)
1 sibling	319 (49.7)
2 siblings	96 (15)
3 or more siblings	8 (1.4)
Family history of smoking	
Only mother smokes	101 (15.9)
Only father smokes	108 (17.0)
Both parents smoke	113 (17.7)
Neither parent smokes	314 (49.4)

Values represent numbers of subjects, with percentages in parentheses, except where indicated otherwise.

the analyses. The demographic characteristics of the study group and their families are shown in tables 1 and 2, respectively.

In this survey, 78.8% of the students had heard about asthma, and 94% of them knew of someone with asthma. Of the students who indicated that they knew of a disease called asthma, 24.3% declared that they had heard of this disease from a doctor, 57.5% from television, 25.9% from the Internet, 28.9% from books, 37.5% from newspapers, 19.2% from magazines and 9.2% from a friend (fig. 1).

Questionnaire Scores and Success Rates

For one question related to asthma symptoms (Appendix, Q2: Question 17), 2 subtitles were answered by fewer than 10% of the overall students, and thus statistical analysis could not be conducted and they were excluded from the calculations. Omission of these 2 subtitles did not have a direct bearing upon the results. In this way, the symptom score and total score were calculated out of 20 and 65, respectively. The median total questionnaire score (primary outcome) before the education was 38 (range 2–55), and it improved significantly after the students had received the education offered [49 (18–63); $p < 0.001$].

The median number of correct answers for the 5 categories (category scores) and the success rates (percentage of correct answers) were significantly improved after the students had received the education offered (table 3). Also, the number of correct answers and p values for each category in the questionnaire are presented in the Appendix (Q1–Q5). The success rate (percentage of correct an-

Table 2. Family characteristics of the study population

	Mother	Father
Occupation		
Manager	21 (3.3)	29 (4.6)
Housewife	105 (16.5)	–
Teacher	107 (16.8)	19 (3)
Doctor	83 (13.1)	106 (16.7)
Health worker	20 (3.1)	–
Lawyer	15 (2.4)	25 (3.9)
Public officer	173 (27.2)	101 (15.9)
Retired	35 (5.5)	16 (2.5)
Engineer	49 (7.7)	150 (23.6)
Architect	28 (4.4)	–
Finance official	–	49 (7.7)
Self-employed	–	141 (22.2)
Highest education level		
Primary school	5 (0.8)	3 (0.5)
Secondary school	4 (0.7)	2 (0.3)
High school	74 (12.4)	46 (7.7)
University	516 (86.1)	545 (91.4)

Values represent numbers of subjects, with percentages in parentheses, except where indicated otherwise.

swers) after the education exceeded 70% in each category (before and after success rates for general asthma knowledge were 56.5 vs. 74%, for symptoms of asthma 50 vs. 75%, for treatment of asthma 75 vs. 75.4%, for asthma and sports 40 vs. 70%, and for asthma and school attitude 87.5 vs. 100%; the before and after success rates for the total questionnaire score were 58.4 vs. 75.4%).

The Effect of Gender on the Questionnaire Scores

After the education, total questionnaire scores improved significantly for both genders [before and after questionnaire scores for girls were 38 (7–55) vs. 50 (29–63), $p < 0.001$; for boys they were 37 (2–55) vs. 48 (18–61), $p < 0.001$]. When the total questionnaire scores of girls and boys were compared before and after the education, it was observed that the girls were more successful in comprehending the topic after the education than the boys ($p = 0.002$; table 4).

The Effect of the Mother's Education Level on the Questionnaire Scores

It was found that 516 of the participants (80.2%) had a university graduate mother. The total questionnaire score of the children who had a university graduate mother was higher both before education [38 (6–55) vs. 36 (10–50); $p = 0.017$] and after education [49 (24–63) vs. 47 (18–62);

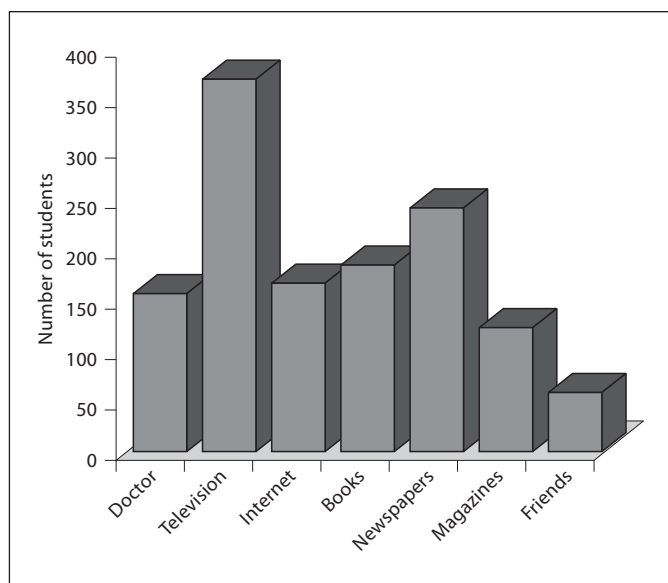


Fig. 1. Sources of asthma knowledge of the study population.

$p = 0.006$] when compared with children who did not have a university graduate mother (table 4).

The Effect of the Father's Education Level on the Questionnaire Scores

It was discovered that 545 of the participants (91.4%) had a university graduate father. It was found that the father's education level had no effect on pre- and posteducational total questionnaire scores (table 4).

The Effect of Having a Parent Who Is a Physician

In the study group, 83 (13.2%) of the mothers and 106 (16.5%) of the fathers were physicians. Thus, 19.6% of the students had at least one physician parent. Before the education, the total questionnaire score of the students with at least one physician parent was not different from that of the other students [39 (18–55) vs. 38 (2–55); $p = 0.066$]. However, after the education, the total questionnaire score of the students with at least one physician parent was higher than that of those without a physician parent [50 (33–61) vs. 49 (18–63); $p = 0.041$] (table 4).

Discussion

The results of our survey indicated that after receiving theoretical education in the form of a booklet, this group of adolescents, most of whom did not have asthma, had

Table 3. Comparison of pre- and posteducation questionnaire scores

Questionnaire category	Questionnaire score		p
	before	after	
General knowledge of asthma	13 (0–21)	17 (8–23)	<0.001
Symptoms of asthma	10 (0–20)	15 (0–20)	<0.001
Treatment of asthma	3 (0–4)	3 (0–4)	<0.001
Asthma and sports	4 (0–10)	7 (0–10)	<0.001
Asthma and school attitude	7 (0–8)	8 (0–8)	<0.001
Total questionnaire score	38 (2–55)	49 (18–63)	<0.001

Data represent medians (range).

p values were calculated using the Wilcoxon signed-rank test.

increased knowledge about asthma, and their misconceptions about this disease had changed to a great extent. The success rate of the total questionnaire scores improved from moderate to satisfactory with the help of the education in our study (from 58.4 to 75.3%). In another survey, education improved the success rate but still stayed at a moderate level [22]. A better improvement in the success rate in our study may be due to the content of the booklet and/or questionnaires or the high socioeconomic level of the children and their families. In a previous study, Pinto [2] showed that students' knowledge of asthma was acquired mainly from the family. In accordance with this, we found that female gender, having a university graduate mother and having a physician parent all had a significant influence on the improvement of the total scores.

It was remarkable that the study group had basic knowledge about asthma even before this education, and that they indicated that television (57.5%) and newspapers (37.5%) served as their major sources of knowledge. In previous studies, healthy adolescents considered television, newspaper, family members and their friends to be the major knowledge sources [1, 2, 8]. Our study and previous reports reveal that the media has an important role in the education of society about asthma. In our study, only 9.2% of children reported that they had learned about asthma from a friend, which may be explained by the low number of asthmatic children in our survey. Before the education, the study group chose shortness of breath (94.1%) as the main symptom of asthma; however, fewer children knew that cough (63.4%) and wheezing (41.9%) are also asthma symptoms. In another study, schoolteachers indicated shortness of breath (68%), wheezing (12%) and coughing (6%) as the symptoms of asthma [10]. After

Table 4. Factors affecting the total questionnaire score

	Number of subjects	Pre-education score	Posteducation score	p
Gender				
Female	305 (47.5%)	38 (7–55)	50 (29–63)*	0.002
Male	337 (52.5%)	37 (2–55)	48 (18–61)*	
Mother's education				
University graduate	516 (80.2%)	38 (6–55)	49 (24–63)*	0.006
Not a university graduate	83 (19.8%)	36 (10–50)	47 (18–62)*	
Father's education				
University graduate	545 (91.4%)	38 (6–55)	49 (18–63)*	0.173
Not a university graduate	51 (8.6%)	36 (18–55)	47 (33–61)*	
At least one parent a physician				
Yes	123 (19.6%)	39 (18–55)	50 (33–61)*	0.041
No	506 (80.4%)	38 (2–55)	49 (18–63)*	

Data are presented as medians (range), except where indicated otherwise. p values for between-group comparisons (i.e. male vs. female, university graduate vs. not a university graduate and having a physician parent vs. not having a physician parent) were calculated using the Mann-Whitney U test.

* p < 0.001 for within-group comparisons (Wilcoxon signed-rank test).

the education in our study, over 70% of the participants also chose wheezing and cough as symptoms of asthma, which indicates that we fulfilled our goal. Previous studies suggest that the diagnosis of asthma can be difficult, especially in adolescents as they have a tendency to deny it or claim not to have had asthma symptoms [3, 7, 26, 27]. This study may also have secondary advantages. There is no doubt that most of the families had a look at the material while the participants were reading the booklet. Therefore, education of school children about asthma symptoms may help to promote awareness about asthma not only among themselves but also among their families.

The knowledge about asthma triggers in our study group was fairly good even before the education. The most common asthma triggers known were pollen, house dust mites and passive smoking (Appendix, Q2). However, knowledge about exercise, cold weather and aspirin as asthma triggers was poor before the education. Unfortunately, knowledge about these three triggers reached only moderate levels after the education.

Before our education was offered to these pupils, 85.7% of the participants in the study group had known that inhalers are primarily used in the treatment of asthma, which increased to 92.5% after the education. Unfortunately, the education was not effective regarding the belief that a herbalist can also treat asthma. This misconception may have been caused by the media and the Internet, where people are often exposed to news of or advertisements for homeopathic drugs. It is also possible

that the information in our booklet about homeopathy was not detailed enough to remove this misapprehension.

Most of the children in our survey believed that asthma prevents children from participating in sports requiring a great deal of physical effort. This assumption was changed by the education, a result which was similar in previous studies [2, 10, 13]. The students believed that ballet, table tennis and swimming are the most suitable sports for asthmatics.

Within the 5 categories, the highest scores before and after the education were related to asthma and attitudes at school. Our results show that healthy adolescents do not see any difference between themselves and asthmatic patients. The healthy adolescents think that asthmatics can be as successful as they are and have a high degree of tolerance toward adolescent asthmatics, as shown in other studies [2, 8, 9, 22].

There is not yet a measurement tool to confirm that the improved scores in all 5 categories are the direct effect of the questionnaire. The participants may have acquired their information (related to asthma) from other sources rather than from the booklet we distributed. For instance, 19.6% of students in our study had at least one physician parent, which had a positive impact on the posteducational scores. This shows that physician parents contributed positively to the level of knowledge of the participants; nonetheless, this invaluable contribution did not count more than one question. We assume that even though this 'one-question difference' is statistically significant, it did

not lead to a substantial impact upon the results in practice. Likewise, the increase observed in the scores for the questions on asthma treatment after the education was found to be significant, yet minor. Furthermore, the education offered with our booklet was found to be ineffective with regard to changing the belief that a herbalist can also treat asthma. This may have been due either to the fact that the number of questions was insufficient or that the information regarding the treatment of asthma was not sufficiently detailed. If the participants could have acquired enough information to influence the results positively, then we might have presumed that the changes seen in the scores for asthma treatment would have been more marked. Besides, since more than 70% of questions were

answered correctly in all 5 categories in our study after the education, this significant increase proves that this type of booklet-based education may also have a significant impact on the results.

In conclusion, school-based education programs for nonasthmatic adolescents are as important as those aimed at asthmatic adolescents. Theoretical material in the form of a booklet can be used in a school-based asthma education program in order to improve the knowledge of adolescents about asthma. Moreover, school-based education programs may help to reduce the rate of underdiagnosed asthma by raising the awareness of adolescents and their family about asthma.

Appendix

The Questionnaire and the Effect of Education on the Answers

Q1. Questions about the general knowledge of asthma

Questions	Correct answer	Correct answers, n		p
		before	after	
1 Asthma is a lung disease	correct	507 (79)	571 (88.9)	<0.001
2 Asthma is more frequent among families of low socio-economic status	correct	208 (32.4)	480 (74.8)	<0.001
3 Family history of asthma is a risk factor in developing asthma	correct	352 (54.8)	434 (67.6)	<0.001
4 Asthma is a contagious disease	incorrect	573 (89.3)	607 (94.5)	<0.001
5 Asthma may be curable	correct	365 (56.9)	480 (74.8)	<0.001
6 There is a relationship between asthma and severe bronchiolitis	correct	366 (57)	484 (75.4)	<0.001
7 Asthma is a seasonal disease	correct	478 (74.5)	584 (91)	<0.001
8 Moving to another region is beneficial for asthmatic patients	incorrect	217 (33.8)	281 (43.8)	<0.001
9 Having a bath is risky for asthmatic patients	incorrect	555 (86.4)	564 (87.9)	0.001
10 What should the clothes of asthmatic patients be made of				
A Cotton	correct	347 (54)	462 (72.0)	<0.001
B Wool	incorrect	259 (40.3)	333 (51.9)	<0.001
11 Asthmatic patients should have all the childhood vaccines	correct	426 (66.4)	521 (81.2)	<0.001
12 Some jobs are risky for asthmatics				
A Doctor	incorrect	294 (45.8)	511 (79.6)	<0.001
B Teacher	incorrect	295 (46)	400 (62.3)	<0.05
C Carpenter	correct	316 (49.2)	436 (67.9)	<0.001
D Gardener	correct	344 (53.6)	420 (65.4)	<0.001
E Baker	correct	288 (44.9)	397 (61.8)	<0.05
F Judge	incorrect	313 (48.8)	440 (68.5)	<0.05
G Driver	incorrect	296 (46.1)	406 (63.2)	<0.05
H Footballer	incorrect	186 (29.0)	363 (56.5)	<0.05
I Dyer/painter/decorator	correct	332 (51.7)	435 (67.8)	<0.001
J Hairdresser	correct	275 (42.8)	410 (63.9)	<0.001
13 Asthmatic patients can be as successful as nonasthmatic patients	correct	500 (77.9)	571 (88.9)	<0.001

Figures in parentheses represent percentages. p values were calculated using McNemar's test.

Q2. Questions on asthma symptoms

Questions	Correct answer	Correct answer, n		p
		before	after	
14 Which of these are asthma symptoms?				
Cough	correct	407 (63.4)	567 (88.3)	<0.001
Shortness of breath	correct	604 (94.1)	618 (96.3)	0.647
Wheezing	correct	269 (41.9)	483 (75.2)	<0.001
Chest tightness	correct	263 (42.0)	342 (53.3)	<0.001
Tachypnea	correct	269 (41.9)	324 (50.5)	<0.001
15 Stress affects asthmatic patients negatively	correct	438 (68.2)	484 (75.4)	<0.001
16 Which of the following trigger asthma?				
Pollen	correct	462 (72.0)	608 (94.7)	<0.001
House dust mites	correct	452 (70.4)	615 (95.8)	0.031
Exercise	correct	113 (17.6)	267 (41.6)	<0.001
Aspirin	correct	41 (6.4)	251 (39.1)	<0.001
Some foods	correct	137 (21.3)	235 (36.6)	<0.001
Respiratory tract infections	correct	432 (67.3)	525 (81.8)	<0.001
Cold weather	correct	199 (31.0)	419 (65.3)	<0.001
Pets	correct	40.9 (63.7)	560 (87.2)	<0.001
Air pollution	correct	442 (68.8)	548 (85.4)	<0.001
Exposure to tobacco smoke	correct	503 (78.3)	590 (91.9)	0.001
Mould	correct	171 (26.6)	483 (75.2)	<0.001
Perfume scent	correct	280 (43.6)	477 (74.3)	<0.001
17 Which seasons are related to asthma symptoms?				
Spring	correct	376 (58.6)	509 (79.3)	<0.001
Summer	incorrect	6 (0.5)	3 (0.5)	–
Autumn	correct	1 (0.2)	2 (0.3)	–
Winter	correct	89 (13.9)	364 (56.7)	<0.001

Figures in parentheses represent percentages. p values were calculated using McNemar's test.

Q3. Questions on asthma treatment

Questions	Correct answer	Correct answer, n		p
		before	after	
18 Who should treat asthma?				
A Doctor	correct	607 (94.5)	612 (95.3)	0.019
B Herbalist	incorrect	270 (42.1)	310 (48.3)	<0.001
19 Which drugs should be used in the treatment of asthma?				
A Inhaler drugs	correct	550 (85.7)	594 (92.5)	<0.001
B Antibiotics	incorrect	358 (55.8)	524 (81.6)	<0.001

Figures in parentheses represent percentages. p values were calculated using McNemar's test.

Q4. Questions on asthma and sports

Questions	Correct answer	Correct answer, n		p
		before	after	
20 It is dangerous for asthmatic patients to do sports	incorrect	281 (43.8)	423 (65.9)	<0.001
21 Can asthmatic patients do the following sports?				
A Swimming	correct	240 (37.4)	451 (70.2)	<0.001
B Volleyball	correct	219 (34.1)	379 (59.0)	<0.001
C Basketball	correct	213 (33.2)	345 (53.7)	<0.001
D Football	correct	197 (30.7)	318 (49.5)	<0.001
E Table tennis	correct	263 (41.0)	415 (64.6)	<0.001
F Ballet	correct	345 (53.7)	492 (76.6)	<0.001
22 Can asthmatic children exercise with their peers?	correct	505 (78.7)	585 (91.1)	<0.001
23 Physical exercise in cold weather triggers asthma symptoms	correct	427 (66.5)	582 (90.8)	<0.001
24 Asthma medications prevent asthma symptoms	correct	301 (46.9)	494 (76.9)	<0.001

Figures in parentheses represent percentages. p values were calculated using McNemar's test.

Q5. Questions on asthma and school attitude

Questions	Correct answer	Correct answer, n		p
		before	after	
25 Do you believe that the conditions below are related to asthma?				
A Getting bad grades	incorrect	476 (74.1)	490 (76.3)	<0.001
B Not passing the class	incorrect	473 (73.7)	514 (80.1)	<0.001
26 The teacher should be informed about a child's asthma	correct	596 (92.8)	625 (97.4)	<0.001
27 It is bothering to have an asthmatic classmate	incorrect	536 (83.5)	572 (89.1)	<0.001
28 Being asthmatic is embarrassing	incorrect	609 (94.9)	605 (94.2)	<0.001
29 Which preventions shown below should be taken for asthmatic patients in the classroom				
A Bad smells and dust should be avoided in the classroom	correct	585 (91.1)	609 (94.9)	<0.001
B Everyone should try to help their asthmatic classmates	correct	585 (91.1)	618 (96.3)	<0.001
C Teachers should have knowledge about asthma and its treatment	correct	547 (85.2)	583 (90.8)	<0.001

Figures in parentheses represent percentages. p values were calculated using McNemar's test.

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