

Efficacy of asthma education program on asthma control in children with uncontrolled asthma

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SUMMARY: Arıkan-Ayyıldız Z, Işık S, Çağlayan-Sözmen Ş, Anal Ö, Karaman Ö, Uzuner N. Efficacy of asthma education program on asthma control in children with uncontrolled asthma. Turk J Pediatr 2016; 58: 383-388.

We aimed to evaluate the efficacy of a group education program on asthma control for children with uncontrolled asthma. Patients were randomized to receive 1-hour group education program with their parents or usual care. Our primary outcome was the change in asthma control test (ACT) between baseline and month 3 and secondary outcomes were health care utilizations and self report of exacerbations of asthma symptoms and missed school days. Change of ACT between baseline and 1st month and 3rd month was not significant in education and usual care groups. Health care utilizations and self reported exacerbations in the study groups were similar while missed school days were significantly higher in usual care group. The results of the study suggest that group education may play a useful role in the management of children with uncontrolled asthma but it is not significantly effective when compared with usual care.

Key words: education, uncontrolled asthma, children, intervention.

Asthma is the most common chronic disease of childhood in developed countries and affects more than 150 million people all over the world¹. All asthma guidelines published concerning adults or children emphasize the importance of asthma control in management of asthma¹⁻³.

Asthma control has been reported to be poor in Turkey^{4,5}. Emergency room visits and hospitalization rates are higher than those in EU countries⁴⁻⁶. There have been many studies about the role of asthma education on control of asthma in the world, but our national data is scarce⁷⁻⁹. There is a need for defining and creating an optimal education program for children with asthma in our country.

We report the results of a randomized trial to assess the effect of an educational intervention among children with poorly controlled asthma.

Material and Methods

We conducted a randomized prospective trial to

evaluate the efficacy of asthma group education program on asthma control in children with uncontrolled asthma. The study was approved by the local ethical committee and all participants were given informed consent.

Study population

We recruited children aged 5-18 years with uncontrolled asthma from the Pediatric Allergy Unit of Dokuz Eylül University, Izmir. Recruitment occurred between December 2012-May 2013. Asthma was diagnosed according to the GINA guidelines and poor control was defined as having asthma control test scores below 19¹. Patients who did not give informed consent, who had serious comorbidities and patients planning to move in the following months were excluded.

Randomization and consent

Eligible subjects were randomized to the group education program or usual care in equal groups. Blocks of varying sizes were

used for randomization to assure the balance of randomization assignments over time. Informed consent was obtained from the parents of the children and from the children themselves above the age of 10 according to the instructions of local ethical committee. A total of 78 children were randomized into the study. Consort diagram of the study is shown in Figure 1.

Intervention

The study intervention consisted of 1 hour interactive class for at least 5 children and their parents taught by trained educator. The content of the class was based on the goals of the education program stated by guidelines which was revised for children and included information on the pathogenesis of asthma, environmental triggers for asthma exacerbations, medications and how they act on disease, and how are the inhaled medications used. Videos

and visual presentations were used in group education. Individual questions and preventive measures were discussed at the end of each session. Usual care included demonstration of the use of inhaler devices and medication and prevention advices from the clinical nurse according to the atopic status of the individual patient.

Time to intervention ranged between 1-14 days post randomization and 7 of the 41 children assigned to the intervention did not attend the class.

Measurements

We administered questionnaires and assessed lung function at baseline (prior to randomization) and again at one month and 3 months following randomization. Baseline questionnaire including demographics and clinical data were filled out by the clinician. Baseline demographic data included age, sex, age at diagnosis, comorbid allergic diseases, presence of atopy determined by positive skin prick tests. Skin prick tests were performed by using a panel of aeroallergens (Allergopharma) including house dust mites, animal dander grass and cereal pollens, molds and tree pollens according to the EAACI guidelines¹⁰. Hospitalizations, self reported exacerbations, emergency room visits, unplanned hospital visits and missed school days were recorded by the physician at each visit.

We measured asthma control using the asthma control test (ACT), a standardized validated instrument that has been translated and validated for use in the Turkish language with children aged 4 and older^{11,12}. Scores vary between 0-27 for the ACT of children aged 4-11 and 5-25 for the ACT of the children older than 12, with higher scores indicating better control and a score below 19 generally used to indicate uncontrolled asthma^{11,12}. Asthma control tests were filled out by the children

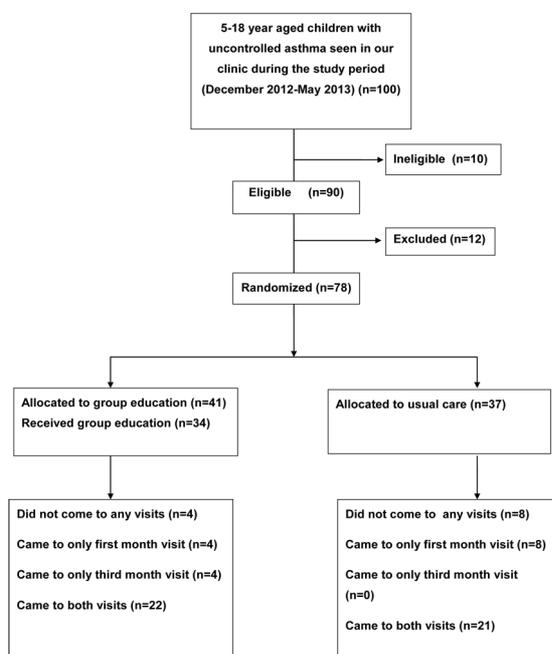


Fig. 1. Consort diagram of the study

Table I. Demographics of the Children with Uncontrolled Asthma Participating in the Study

Variables	Education (n=26)	Usual care (n=21)
Age (mean±SD)	10.1±2.7	9.7±3
Female (%)	50	47.6
Age at diagnosis (mean±SD)	6.17±3.2	6.3±3.3
ACT Baseline (mean±SD)	13.8±3.4	15.6±3.2

ACT: asthma control test

aged older than 12 and by the child and the parent between ages 5-12. The change in ACT between baseline and month 3 served as our primary outcome and change from baseline to month 1 as a secondary outcome.

Additional secondary outcomes were health care utilizations including self reported hospital visits, emergency room visits and unscheduled hospitalizations and self report of exacerbations of asthma symptoms, and self-report of missed school days.

Analysis

The study was designed to have 80% power to detect a mean difference of 2 in ACT change between the groups assuming a standard deviation of change in ACT of 4, a two-tailed test, and a type 1 error rate of 5%. All calculation were done in SPSS for Windows, version 15 Stata, Version 12.

Descriptive characteristics were shown as mean±SD, percentiles or median according to the type of the data. The change in ACT between baseline and months 1 and 3 was compared with linear regression model after adjusting the baseline ACT levels. Secondary outcomes were compared between groups using Chi-square and Mann-Whitney U test.

Results

Twenty six patients in the education group and 21 patients in the usual care group were included in the study. The mean age of the study population was 9±2.8, 50% of the patients were female and the mean age of diagnosis was 6.3±3.2 and all these variables were similar in both groups. (Table I).

Change of ACT between baseline and 1st month and 3rd month was not significant in education and usual care groups (p=0.9) and this result was consistent in different age groups having different asthma control tests (Table II). The increase of ACT between baseline and first month was larger in educational group but this was not statistically significant (Table II, Fig. 2).

We assessed health care utilizations and self reported exacerbations in the study groups and the difference was not significant (p=0.2, p=0.5, p=0.74, p=0.2) while missed school days were significantly higher in usual care group (Table III).

Discussion

In this randomized trial, we found that 1-hour educational intervention for children with uncontrolled asthma and their parents did not affect the asthma control assessed in the first and third months. Asthma control test scores tended to increase on the following months in both groups but scores at the first month in

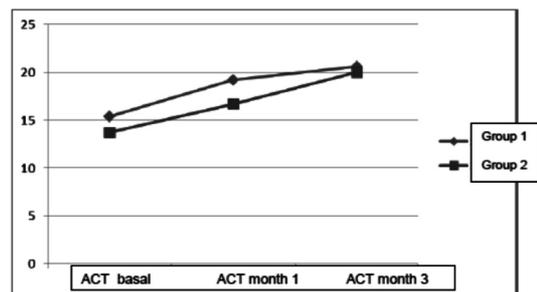


Fig. 2. Trends of ACT scores in two groups during the study period (Group 1: Education, Group 2: Usual care)

Table II. Impact of Intervention on Asthma Control Adjusted for Baseline ACT

ACT	Age 5-11		p	Age >12	
	Education (n=17)	Usual Care (n=14)		Education (n=9)	Usual Care (n=7)
Baseline (mean±SD)	16.1±2.2	13.7±3.9		14±4.1	13.7±2.2
Change at the 1st month	3.5±3	3.0±4.5	0.2	3.4±3.9	2.6±2.6
Change at the 3rd month	4.7±3.8	6.1±3.8	0.9	6±4.7	6.4±3.7

*Missed data: 4
ACT: asthma control test

Table III. Secondary Outcomes of the Study Population

Secondary outcomes	Education (n=26)	Usual care (n=21)	p
Health care utilization*	23	28.5	0.74
Self-reported exacerbations*	19.2	42.8	0.2
Missed school days [‡]	0.1±0.3	2±4	0.006

* Expressed as (%),[‡] Expressed as mean±SD

ACT: asthma control test

the education group increased more than usual care group although it was not statistically significant.

Education has a primary role in asthma management and the role of education has been assessed in asthma control in previous studies¹³⁻¹⁸. Asthma education programs in these studies are different in their nature by means of population, intervention and duration. In general, education programs are aimed at asthmatic children or/and their caregivers. Education of caregivers help their control of home environment and their childrens' asthma signs and symptoms¹⁷. Asthmatic children whose caregivers underwent a targeted education were found to have fewer emergency department visits¹⁵. But there is also a study in the literature that indicates educational intervention is not beneficial when targeted to only caregivers¹⁴. Educational interventions also differ in the literature. There are educational programs for individual groups, group educations (asthma class, asthma camp etc.) and web based individual programs. Most of the studies report reductions in emergency department visits, hospitalizations and overall improvement of asthma control^{18,19}. Studies evaluating the effects of education report benefit of education when they evaluate the outcomes on 6th months and 12th months^{14,16,18-19}. We evaluated our outcome measurements 1 and 3 months after intervention. This period may be regarded as short for evaluation but the inconsistent improvement of asthma control test on 1st and 3rd months may also be attributed to the patient group which have uncontrolled asthma.

Health care utilizations are one of the most important issues used in health economics and we chose health care utilizations as our secondary outcomes. Asthma control program in Brazil which included training of health professionals and educational interventions for

the patients were found to reduce the number of asthma related hospital admissions²⁰. Education provided in school asthma class or in asthma day camp also yielded significant reductions in the emergency department and office visits¹⁹. We found that hospitalizations, emergency room admissions and unscheduled hospital visits were not different between groups but missed school days were significantly lower in education group. This result can be attributed to the increase of self-confidence and better coping with disease after group education program.

Uncontrolled asthma is found to be associated with low maternal education with strong beliefs about medication necessity and higher concern about potential side effects of medication^{21, 22}. Education programs are effective in asthma control because they change the behavior of the patients and caregivers on medication and help improvement of adherence, acute attack management and avoidance of triggers^{15-17, 23-24}. We think that the perception of disease and medication by child and parents changed with the educational intervention, however, we did not measure how the education affected and changed behavior in our study.

This study has some potential limitations. First of all, the time of the assessments were somewhat different because education was offered to patients after a mean period of 7 days after randomization but this was not the case in usual care group. And the second and most important limitation was the power of our study. We planned to include more patients but the sample size we could reach gave us only 40% power. We reached encouraging results about the effects of education in our study but because of limited power, our study can be regarded as a pilot study.

We could not reach any significant differences by means of primary outcome in study groups. Usual care education may be sufficient enough

to touch the routine life or the content of group education may be insufficient or too wide to concentrate for the attenders. Early timing of ACT measurements in each group may also be the reason of this result as we discussed before.

Randomized trials are more reliable for demonstration of difference between two groups. But adherence to that kind of studies becomes a real life problem as realized in our study. Our sample size decreased because of the need of extra time for educational class. We think that the impact of usual care which is provided at the same time with the doctor visit can also be improved and educational interventions can be offered within the visit.

Although underpowered, the preliminary results of our study is promising for the positive effects of education on asthma control. In larger patient populations, it will be more clear to outline the short-term and long-term effects of the education and the need for the repetitive education programs could be more precisely defined.

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