

AN INDIVIDUALIZED APPROACH IN THE EDUCATION OF ASTHMATIC CHILDREN

Biserka Čičak, Eva Verona and Iva Mihatov-Štefanović

University Department of Pediatrics, Sestre milosrdnice University Hospital, Zagreb, Croatia

SUMMARY - Asthma is the most prevalent chronic disorder of childhood. In a large number of cases, it can be well managed. In addition to accurate diagnosis, appropriate therapy and control of environmental factors, a good educational program is required, which has not yet received due attention. Prompted by the fact that a large number of asthmatic children and their parents lack sufficient knowledge about asthma, six years ago we launched an individual educational program for all asthmatic children over seven years of age and their parents. We monitored a group of 58 asthmatics, the first to have completed our individual educational program, during the year before and the year after they had received individual education. The prerequisites for inclusion in the study were that the child was over seven years of age, diagnosed with chronic asthma according to the GINA guidelines and had been monitored for one year prior to receiving individual education. We compared the number of asthma exacerbations, hospitalizations due to asthma, days with asthmatic symptoms, the mean value of the forced expiratory volume in 1 second (FEV 1), and the mean dose of inhaled corticosteroids (ICS) taken during the year before and the year after receiving individual education. Study results showed the number of asthma exacerbations ($p < 0.0001$), hospitalizations due to asthma ($p = 0.0236$) and days with asthmatic symptoms ($p < 0.0001$) to have significantly reduced, along with a significant increase in FEV 1 ($p < 0.0001$) and lower mean ICS dose ($p < 0.0001$) upon completion of individual educational program. It is concluded that the addition of individual education in the treatment of asthmatic children enables better control of the disease (lower number of hospitalizations and asthma exacerbations, increased FEV 1) with a lower mean ICS dose. The knowledge about asthma acquired by the children and their parents, self-management, compliance with the written asthma management plan, control of environmental factors, along with good cooperation of the patients and parents in the management of asthma certainly contributed to this favorable observation.

Key words: *Asthma – psychology; Patient-education; Knowledge – attitudes, practice; Quality of life; Self-care; Child*

Introduction

Asthma is the most common chronic disease among children, with a significant increase in its prevalence, especially in recent decades¹. Although it is a disease that can be well controlled with current therapy in the majority of cases, a satisfactory control of the disease has not yet been achieved in a large number of children. Therefore, asthma is a major cause of school absenteeism, nocturnal symptoms, and limitation of physical ac-

tivities resulting in lower quality of life in asthmatic children¹⁻⁴.

Numerous factors are responsible for the incomplete control of asthma, such as inappropriate treatment and anti-inflammatory therapy, lack of cooperation by the patients or their parents, environmental factors and, recently especially emphasized inadequate education of asthmatic children and their parents⁵⁻⁷.

Today, the goal of asthma treatment is to achieve good or complete control of the disease with the minimal dose of medication. In order to achieve this goal, it is necessary to establish an accurate diagnosis of asthma, administer appropriate therapy and control environmental factors, while avoiding or minimizing the effects of environmental triggers. Today, great importance is attached

Correspondence to: Biserka Čičak, MD, MS, University Department of Pediatrics, Sestre milosrdnice University Hospital, Vinogradska c. 29, HR-10000 Zagreb, Croatia
E-mail: biserka.cicak1@zg.t-com.hr
Received August 14, 2008, accepted in revised form November 28, 2008

to conducting a good educational program, in which emphasis is placed upon self-management of the disease⁶⁻⁹. Self-management of the disease in the treatment of asthma implies taking appropriate medication, using a peak expiratory flow (PEF) meter, monitoring response to therapy, recognizing symptoms and signs of the disease worsening, and following a written asthma management plan, including the treatment of exacerbations^{6,8,9}.

Numerous investigations to date have demonstrated that, unfortunately, a large number of children with asthma and their parents lack due knowledge about the basic nature of the disease and its treatment⁹⁻¹¹. Numerous asthmatics are hospitalized because they stop taking their medications, fail to recognize the first symptoms of the disease, do not cooperate regarding treatment, or use an inappropriate technique of medication^{4-7,10,11}.

According to data available, many asthmatic children and their parents that complete group educational programs do not actually acquire all the necessary knowledge about asthma, especially self-management of the disease and self-treatment of asthma exacerbations. Therefore, six years ago we launched a program of individual education of asthmatic children over seven years of age, together with their parents. This article presents the results of our study of the effectiveness of the individual educational program in achieving better control of asthma.

Through this investigation, we wanted to assess whether the addition of an individual educational program to the classic group educational program provided for asthmatic children over seven years of age and their parents would lead to better control of the disease, and how the individual educational program would affect the number of asthma exacerbations, hospitalizations due to asthma and days with asthma symptoms, as well as lung function measurements (FEV₁) and daily dose of inhalation corticosteroids.

Subjects and Methods

The number of asthma exacerbations (the use of short-acting beta 2 agonists for three or more days, together with reduced PEF in the yellow or red zone), hospitalizations due to asthma, days with asthma symptoms, the mean forced expiratory volume in 1 second (FEV₁) and the mean daily dose of inhaled corticosteroids during the year prior to the introduction of the in-

dividual educational program (i.e. when they had only completed group education) were compared with the respective figures during the year after the individual educational program in a group of 58 subjects.

The study initially included 66 subjects that were the first to complete the individual educational program together with their parents. Inclusion criteria were that the child had been diagnosed with persistent asthma according to GINA guidelines, was over seven years of age so that he/she could participate in the individual educational program, and regular check-ups and monitoring for a year prior to the introduction of the individual educational program. Data were collected on 58 subjects, whereas complete data were not available on eight subjects because they failed to present for regular check-ups or the information in asthma diaries was incorrectly recorded.

The individual educational program was conducted at a polyclinic by a specially trained nurse for two 45-minute periods. The parents and children also attended a lecture by a physician and workshops that lasted for one hour. The main topics of the individual educational program are as follows:

1. What is asthma, its basic pathophysiology and pathogenesis
2. What are the most common asthma triggers and how can they be avoided or minimized
3. Which medications are used in the treatment of asthma, with special reference to difference between controller and relief medications
4. The correct technique of taking various forms of medication
5. Correct use and care of volumatic spacer devices
6. What is a PEF meter and importance of daily monitoring PEF measurements and asthma symptoms, and role of PEF zones in asthma diary
7. The importance of a written asthma management plan, including the treatment of asthma exacerbations
8. Recognition of asthma symptoms and what should be undertaken when asthma symptoms occur
9. Lifestyle modification to avoid asthma exacerbations
10. How to live with this chronic disease

The individual educational program continues during regular check-ups by a physician, every three months on an average, lasting for fifteen minutes to half an hour, and consisting of checking on the technique of taking medication, PEF measurement with the patient's own meter, checking that the diary is being kept properly,

change in the PEF zones regarding optimal individual PEF measurements achieved between the check-ups, and answering all the parents' and children's questions.

The parents or the children kept an asthma diary during the year before and the year after the introduction of the individual educational program. Prior to conducting the individual educational program, data were entered in the diary on daily morning and evening PEF measurements, asthma symptoms and use of reliever medications. Upon completion of the individual educational program, they received My Asthma Diary, containing patient data (first name, last name, date of birth, date of asthma diagnosis, and asthma classification according to the GINA guidelines). This is followed by the PEF zones and their modification during subsequent check-ups, and written instructions on the procedures in particular zones or which medications to use in a particular zone. On the next page, the physician writes the recommended therapy on every visit and records the frequency of taking reliever medications between two visits. This is followed by twelve pages for twelve months of the year, on which the parent or the patient enters morning and evening PEF measurements, possible use of short-acting bronchodilators, and asthma symptoms.

Statistics

In addition to descriptive statistics (mean, standard deviation and percentage), statistical tests were applied to the measured variables for one year after the introduction of the individual educational program in comparison to the status during the year prior to its introduction.

For comparison of the number of asthma exacerbations, hospitalizations due to asthma and days with asthma symptoms during the year before and the year after the introduction of the individual educational program (presented in Table 2), the Poisson generalized model

Table 1. Basic characteristics of study subjects

Number of subjects		58
Age (yrs)	Range ($\bar{x} \pm SD$)	7.2-17.1 (11.4 \pm 2.73)
Sex, n (%)	Male	36 (62%)
	Female	22 (38%)
Duration of asthma (yrs)	Range ($\bar{x} \pm SD$)	0.3-4.5 (1.9 \pm 1.22)
Severity of asthma, n (%)	Mild persistent	25 (43%)
	Moderate persistent	31 (54%)
	Severe persistent	2 (3%)

with the Generalized Estimating Equations (GEE) method was used for re-measurement (before and after education). The GENMOD procedure of SAS (SAS is a registered trademark of SAS Institute, Cary, NC, USA) statistical software was also used.

For comparison (before-after the introduction of the educational program) of variables measured on a continuous scale (FEV₁ and dose of inhaled corticosteroids) (Table 4), the t-test for comparison of dependent samples (t-test of the SAS statistical software) was used.

For analysis of changes (comparison before-after the introduction of the individual educational program) in categorical variables (number of subjects with asthma exacerbations and hospitalizations due to asthma) (Table 3), McNemar's test with the FREQ procedure of the SAS/statistical software was employed.

The calculated p-values were considered to be statistically significant if $p < 0.05$.

Results

Table 1 presents basic demographic characteristics of study subjects. Complete data were collected on 58

Table 2. Comparison of the number of asthma exacerbations, hospitalizations due to asthma and days with asthma symptoms between the year before and the year after individual education (IE)

Monitoring period		Year before IE	Year after IE	z-value	P
Number of asthma exacerbations	Total	80	44	6.08	<0.0001
	\bar{x}	1.38	0.76		
Number of hospitalizations due to asthma	Total	16	8	2.26	0.0236
	\bar{x}	0.28	0.14		
Number of days with asthma symptoms	Total	589	388	5.63	<0.0001
	\bar{x}	10.16	6.69		

Table 3. Comparison of the number of subjects with asthma exacerbations and hospitalizations due to asthma between the year before and the year after individual education (IE)

Monitoring period	Year before IE	Year after IE	S-value	P
Number of subjects with asthma exacerbations	39	29	6.25	0.0124
Number of subjects with hospitalizations for asthma	14	8	3.6	0.0578

of 66 asthmatic children initially included. The mean age of study subjects was 11.4 ± 2.73 (range 7.2-17.1) years. There were 36 boys and 22 girls. The mean duration of asthma was 1.9 ± 1.22 (range 0.3-4.5) years. Mild persistent asthma was present in 43%, moderate asthma in 54% and severe asthma in 3% ($n=2$) of 58 study subjects.

Table 2 shows comparison of the total number of asthma exacerbations, hospitalizations due to asthma and days with asthma symptoms during the year before and the year after the individual educational program. From these results, it is evident that the number of asthma exacerbations was reduced from 80 ($\bar{x} = 1.38$) in the year before to 44 ($\bar{x} = 0.76$) in the year after the individual educational program. The number of hospitalizations due to asthma was reduced from 16 ($\bar{x} = 0.28$) to 8 ($\bar{x} = 0.14$) after the individual educational program. The number of days with asthma symptoms decreased from 589 ($\bar{x} = 10.16$) in the year prior to individual education to 388 ($\bar{x} = 6.69$) after the individual educational program. The Poisson model was applied for re-measurement (before and after the individual educational program) and the p-value test indicated a statistically significantly lower number of asthma exacerbations ($p < 0.0001$) and hospitalizations due to asthma ($p = 0.0236$) during the year when the individual educational program was conducted. Table 2 shows the number of days with asthma symptoms to have significantly decreased during the year of continuous individual education of asthmatic children and their parents ($p < 0.0001$).

Table 3 presents comparison of the number of patients with asthma exacerbations and hospitalizations due to asthma during two years of monitoring. The number of patients with asthma exacerbations was re-

duced from 39 in the year before to 29 in the year after the introduction of individual education, while the number of patients hospitalized due to asthma was reduced from 14 to 8 patients in the same period. The p-value of McNemar test (with 1 degree of freedom) for comparison of the number of subjects before and after the individual educational program indicates the number of patients with asthma exacerbations to have been statistically significantly reduced after the individual educational program ($p = 0.0124$); however, there was no statistically significant difference in the number of patients hospitalized due to asthma during the two years of monitoring ($p = 0.0578$).

Comparisons of the mean FEV1 and mean daily dose of inhaled corticosteroids during the year before and during the year after the introduction of the individual educational program are presented in Table 4. These data show the mean FEV1 value to have increased by 2.1% (from $89.9 \pm 6.97\%$ to $92.0 \pm 5.37\%$), while the mean dose of inhaled corticosteroids declined from 187.9 ± 98.69 mcg to 157.0 ± 80.98 mcg. The p-value of t-test (with 57 degrees of freedom) for comparison of the mean values of final samples (before and after individual education) shows a statistically significant increase in FEV1 ($p < 0.0001$; t-value: 6.14) with significant reduction in daily dose of inhaled corticosteroids ($p < 0.0001$; t-value: -5.95).

Discussion

Today it is beyond doubt that successful management of asthma in pediatric patients requires an accurate diagnosis of asthma (based on thorough history, clinical profile and reversibility of bronchial obstruction),

Table 4. Comparison of forced expiratory volume in 1 second (FEV1) and dose of inhaled corticosteroids (ICS) before and after individual education (IE)

Monitoring period		Year before IE	Year after IE	t-test	P
FEV1 (% of anticipated)	$\bar{x} \pm SD$	89.9 ± 6.97	92.0 ± 5.37	6.14	<0.0001
ICS dose (mcg/day)	$\bar{x} \pm SD$	187.9 ± 98.69	157.0 ± 80.98	-5.95	<0.0001

assessment of the disease severity (based on the symptoms, clinical profile, PEF monitoring and spirometry testing), and use of appropriate pharmacotherapy in combination with good educational program for both patients and their parents^{8,12}.

A good educational program for asthmatic children and their parents is one of the essential components of successful treatment of asthma, i.e. good or complete disease management with a minimum dose of medication^{8,10,12}. The goal of asthma treatment is for patients to have no or minimal chronic asthma symptoms at day and night, no limitation of physical activities, no school absenteeism due to asthma, no asthma exacerbations, minimal use of reliever medications, and minimal or no adverse effects of treatment^{8,12}.

Education is one of the four basic components in the treatment of asthma according to recommendations of the National Program for Education and Prevention of Asthma and GINA guidelines^{8,12}.

In order to improve the disease control and to achieve better self-management of asthma, we have introduced the individual educational program for our asthmatics in which all the parents and children over seven years of age are included. Individual education is of utmost importance because it can be adapted to each patient or parent, according to their educational level, lifestyle and exposure to environmental triggers¹³⁻¹⁵. In connection with the procedure for the control of environmental triggers, such as various irritants and aeroallergens, special attention in the individual educational program is paid to those allergens to which the individual patient is hypersensitive based upon skin prick tests and detection of specific immunoglobulins E. On conducting this educational program, great significance is attached to approaches for achieving self-management of the disease such as PEF monitoring, interpreting PEF results, recording the use of short-acting bronchodilators, recognizing symptoms and signs of disease exacerbation, following the written plan of the management of exacerbations, and monitoring therapeutic effects. We emphasize the great significance of the long-term use of controllers (anti-inflammatory medications) for suppression of allergic inflammations, which is essential for the prevention of exacerbations and chronic symptoms in a patient with persistent asthma. The patient and the parents should understand that relievers (short-acting bronchodilators) should only be used for relief of acute symptoms and exacerbations, and that it is necessary to monitor their use accurately because their increased use is a

sign that the disease has been poorly controlled. We test the ability of the patients to take the prescribed form of medication properly, educate them in correct PEF measurements and interpretation of their results, regarding the individual plan of asthma treatment. In order to additionally motivate the parents and children for self-management of asthma, including keeping a diary of symptoms and PEF measurements, each patient is given My Asthma Diary. The individual educational program continues on each medical check-up.

The results yielded by comparison of the number of asthma exacerbations, hospitalizations due to asthma and days with asthma symptoms in 58 study subjects during the year before and the year after the introduction of the individual educational program show a significant reduction in the number of asthma exacerbations, hospitalizations due to asthma and days with asthma symptoms in the year after the introduction of the individual educational program. The number of subjects with asthma exacerbations was significantly reduced in the year after the introduction of the individual educational program, while the number of patients hospitalized due to asthma was also reduced, although the difference was not statistically significant. The statistically non-significant reduction in the number of patients hospitalized for asthma during the two years of monitoring could be explained by the fact that the majority of our asthmatics had mild to moderate asthma (only two patients had severe asthma) and the largest number of exacerbations were treated at outpatient basis or at home and did not require hospitalization. Studies conducted until now have also demonstrated that the individual educational approach and self-management of asthma reduce the number of hospitalizations of asthmatics, the number of emergency visits to a physician, the rate of school absenteeism and nocturnal symptoms¹⁶⁻²⁰. We believe that an effective educational program improves the knowledge of parents and children about asthma, thus also upgrading their compliance with controller medications, making it possible to recognize the first symptoms of asthma exacerbations, the use of appropriate treatment protocol, and avoiding or minimizing the effects of specific and nonspecific environmental triggers, thereby providing improved control of the disease with a smaller number of asthma exacerbations and hospitalizations due to asthma. Comparison of the mean FEV₁ values in the year before and the year after the introduction of the individual educational program also showed a significant increase in FEV₁ value by 2.1%.

Studies conducted up to now also indicate an improvement in pulmonary function and quality of life after good self-management of the disease²⁰⁻²³. The mean daily dose of inhaled corticosteroid (ICS) was significantly lower during the year after as compared to the year before the introduction of the individual educational program. Thus, in the year after the individual educational program, there was a reduction in the number of asthma exacerbations, hospitalizations due to asthma and days with asthma symptoms, with an increase in pulmonary function (FEV 1), all of these achieved with a lower ICS dose. The explanation probably lies in improved patient compliance with the prescribed treatment, control of various environmental triggers and self-management of asthma.

Comparability of the group in this study may be questioned because the same group of patients participated in two different programs one after another, instead of two different groups of patients participating in two different educational programs (group and individual). Therefore, it should be noted that we did not intend to compare different educational programs but to investigate how broadening the educational experience of the same group of patients by adding an individual program to the classic group program would contribute to the control of asthma.

We primarily wanted to investigate the impact of adding supplementary forms of education (an individual approach) to the classic forms of education on improvement in asthma control, starting from the facts that one program does not exclude another but an individual program contributes to further dissemination of knowledge acquired from group forms of education.

Taking into account the aforementioned reasoning, we must consider improved control of asthma to be not only the result of the individual educational program but also of the additional knowledge built upon the knowledge acquired in the group program and, naturally, the result of the therapeutic effect of ongoing anti-inflammatory ICS therapy during the two-year monitoring period.

We know that patient cooperation is essential in the evaluation of educational programs. Of the eight patients excluded during the trial (12% of the original group), four were excluded during the first and second year of monitoring each. Since the same number of subjects were involved during the two years, we believe that it had no impact on final result. Patients were excluded from the study for failing to keep their diaries correctly

and to present for check-ups regularly, which prevented us from collecting relevant data on the number of days with asthma symptoms, number of asthma exacerbations (data in the diary) and FEV 1 values (from spirometry testing at check-ups), which are important indices of asthma control.

Until now, numerous randomized controlled studies have demonstrated the significance of various additional forms of asthma education in improving the quality of life of asthmatics, reducing treatment costs and increasing control of environmental factors²⁴⁻³⁰.

According to our observations, educational programs have made great progress in the treatment of patients with asthma, allowing them to participate actively in their therapy, recognize the symptoms of asthma worsening and to know how to treat them, together with due control of environmental factors. Today, attempts have been made to personalize the education of asthmatics and their parents through individual education and education in small groups, in order to improve the self-management of asthma, achieve complete control of the disease and thereby make it possible for asthmatic children to have normal life^{9,14,20,21,27}.

We believe that with the addition of the individual educational program we have improved the self-management of the disease based upon PEF measurement, early recognition of asthma symptoms, avoidance of environmental asthma triggers, thorough explanation related to asthma medications, volumatic spacer devices and approaches in the treatment of asthma exacerbations, all of which provide a basis for achieving better control of the disease (reducing the number of asthma exacerbations and hospitalizations due to asthma, with increased FEV 1 and a happy and healthy life for children with asthma.

Conclusion

In the treatment of asthmatic children, in addition to pharmacotherapy, it is necessary to provide good education for the children and their parents. Recently, ever more attention has been paid to self-management of the disease. According to the results of this study, the addition of an individual educational program to the classic group educational program contributes to improved control of the disease with a significantly lower number of asthma exacerbations and hospitalizations due to asthma, and improved pulmonary function (FEV 1). All this has been achieved with a lower mean dose of inhaled

corticosteroids, which is again likely to have resulted from good education that led to improved compliance by the patients and their parents, greater control of various environmental triggers, recognition of the first symptoms of the disease worsening and due knowledge of treatment methods.

References

- BRAMAN SS. The global burden of asthma. *Chest* 2006; 130:4S-12S.
- DIETTE GB, MARKSON L, SKINNER EA, NGUYEN TT, ALGETT-BERGSTROM P, WU AW. Nocturnal asthma in children affects school attendance, school performance and parents' work attendance. *Arch Pediatr Adolesc Med* 2000;154: 923-8.
- BARTHOLOMEW LK, GOLD RS, PARCEL GS, et al. Watch, discover, think, and act: evaluation of computer-assisted instruction to improve asthma self-management in inner-city children. *Patient Educ Counsel* 2000;39:269-80.
- FOWLER MG, DAVENPORT MG, GARG R. School functioning of US children with asthma. *Pediatrics* 1992;90:939-44.
- DIETTE GB, SKINNER EA, MARKSON LE, et al. Consistency of care with national guidelines for children with asthma in managed care. *J Pediatr* 2001;138:59-64.
- MASOLI M, FABIAN D, HOLT S, et al. The global burden of asthma: executive summary of the GINA Dissemination Committee Report. *Allergy* 2004;59:467-78.
- LI JT, OPPENHEIMER J, BERNSTEIN IL, et al. Attaining optimal asthma control: a practice parameter. *J Allergy Clin Immunol* 2005;116:S3-11.
- <http://www.ginasthma.org>
- GIBSON PG, POWELL H. Written action plans for asthma: an evidence-based review of the key components. *Thorax* 2004; 59:94-9.
- GIBSON PG, HENRY RL, HALLIDAY J. Asthma knowledge, attitudes, and quality of life in adolescents. *Arch Dis Child* 1995;73:321-6.
- MALIK R, HAMPTON G. Counseling hospitalized pediatric patients with asthma. *Am J Health Syst Pharm* 2002;59:1829-33.
- National Heart, Lung and Blood Institute, National Asthma Education and Prevention Program. Quick reference for the NAEPP Expert Panel Report: Guidelines for the diagnosis and management of asthma. Update on selected topics 2002. Bethesda, MD: US Department of Health and Human Services, National Institutes of Health, 2002; Publication No. 02-5075. Available at: <http://www.nhlbi.nih.gov/guidelines/asthma/index.htm>.
- KALLSTROM JT. Asthma education home-based intervention. *J Clin Med Assoc* 2004;67:207-16.
- BONER S, ZIMMERMAN BJ, EVANS D, et al. An individualized intervention to improve asthma management among urban Latino and African-American families. *J Asthma* 2002;39:167-79.
- CHOY DKL, TONG M, KO F, et al. Evaluation of the efficacy of a hospital-based asthma education programme in patients of low socioeconomic status in Hong Kong. *Clin Exp Allergy* 1999;29:84-90.
- TOELLE BG, PEAT JK, SALOME CM, et al. Evaluation of a community-based asthma management program in a population sample of schoolchildren. *Med J Aust* 1993;158:742-6.
- WILSON SR, SCAMAGAS P, GERMAN DF, et al. A controlled trial of two forms of self management education for adults with asthma. *Am J Med* 1993;94:564-76.
- BERNARD-BONIN AC, STACHENKO S, BONIN D, CHARETTE ROUSSEAU E. Self management teaching programs and morbidity of pediatric asthma: a meta-analysis. *J Allergy Clin Immunol* 1995;95:34-41.
- GUEVARA JP, WOLF FM, GRUM CM, CLARK NM. Effects of education interventions for self management of asthma in children and adolescents: a systematic review and meta-analysis. *BMJ* 2003;326:1308-9.
- LIU CH, FEEKERY C. Can asthma education improve clinical outcomes? An evaluation of a pediatric asthma education program. *J Asthma* 2001;38:269-78.
- BAILRY WC, RICHARDS JM, BROOKS CM, SOONG S, WINDORS EA, MANZELLA BA. A randomized trial to improve self-management practices of adults with asthma. *Arch Intern Med* 1990;140:1664-8.
- HALTERMAN JS, FISHER S, CONN KM, et al. Improved preventive care for asthma. *Arch Pediatr Adolesc Med* 2006;160:1018-25.
- CLARK NM, PARTRIDGE MR. Strengthening asthma education to enhance disease control. *Chest* 2002;121:1661-9.
- POPONICK J. Asthma. We need to do better! *Chest* 1999;116: 1509-10.
- WORSTELL M. Asthma individual patient perspective and current unmet needs. *Clin Exp Allergy* 2000;30:11-5.
- HALTERMAN JS, YOOS HL, CONN KM, et al. The impact of childhood asthma on quality of life. *J Asthma* 2004;41:645-51.
- BABANEL D, ELDRIDGE S, GRIFFITHS C. Can a self-management programme delivered by a community pharmacist improve asthma control? A randomized trial. *Thorax* 2003; 58:851-4.
- RONCHETTI R, INDINNIMEO E, BONCI E, et al. Asthma self-management programmes in a population of Italian children: a multicentric study. *Eur Respir J* 1997;10:1248-53.
- DANIEL KKNG, POK-YU CH, WAI-PING L, et al. Effect of a structured asthma education program on hospitalized asthmatic children: a randomized controlled study. *Pediatr Int* 2006;48: 158-62.
- COFFMAN JM, CABANA MD, HALPIN AH, et al. Effects of asthma education on children's use of acute care services: a meta analysis. *Pediatrics* 2008;121:575-86.

Sažetak

INDIVIDUALIZIRANI PRISTUP U PODUCI ASTMATIČNE DJECE

B. Čičak, E. Verona i I. Mihatov-Štefanović

Astma je najčešća kronična bolest dječje dobi koja se u velikom broju slučajeva može dobro kontrolirati, za što je uz točnu dijagnozu i odgovarajuću terapiju te kontrolu čimbenika okoline potreban i dobar obrazovni program kojem se još uvijek ne posvećuje dostatna pozornost. Upravo potaknuti tom činjenicom da velik broj astmatičara i njihovih roditelja nemaju dostatno znanje o astmi započeli smo prije šest godina program individualne poduke u koju su uključeni svi roditelji i djeca u dobi iznad sedam godina. Pratili smo skupinu od 58 astmatičara koji su prvi prošli individualni program poduke u godini prije te u godini nakon provođenja individualne poduke. Uvjeti za uključivanje u ispitivanje su bili dob iznad sedam godina, dijagnoza trajne astme prema smjernicama GINA te praćenje astmatičara godinu dana prije provođenja individualne poduke. Uspoređivali smo broj egzacerbacija astme, hospitalizacija zbog astme, broj dana sa simptomima astme, srednju vrijednost forsiranog ekspiracijskog volumena u prvoj sekundi (FEV1) te srednju dozu inhalacijskog kortikosteroida (IKS) u godini prije te u godini nakon provođenja individualne poduke. Rezultati ovoga ispitivanja pokazali su da je u bolesnika nakon provođenja individualnog programa poduke statistički značajno smanjen broj egzacerbacija astme ($p < 0,0001$), broj hospitalizacija zbog astme ($p = 0,0236$), broj dana sa simptomima astme ($p < 0,0001$), uza značajan porast FEV1 ($p < 0,0001$), a sve to s nižom srednjom dozom IKS ($p < 0,0001$). Može se zaključiti kako dodatak individualne poduke u liječenju djece astmatičara omogućuje bolju kontrolu bolesti (smanjen broj hospitalizacija i egzacerbacija astme, porast FEV1) uz nižu dozu IKS, čemu sigurno doprinosi bolje znanje djece i roditelja o astmi, o provođenju samokontrole, praćenje pisanog plana liječenja, kontrola čimbenika okoline, uz značajnu suradljivost bolesnika i roditelja u liječenju astme.

Ključne riječi: *Astma – psihologija; Poduka bolesnika; Znanje – stavovi, praksa; Kvaliteta života; Samopomoć; Dijete*