The Impact of a Summer Asthma Camp Experience on Asthma Education and Morbidity in Children

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Background. This study examines whether an educational program emphasizing self-management skills can be successfully implemented in an asthma camp setting, and the degree to which this camp experience would affect asthma-associated morbidity among children attending such a program.

Methods. Ninety asthmatic children between the ages of 6 and 12 years who were attending a summer asthma camp were enrolled in the study. A precamp questionnaire was sent to the parents of these children to assess asthma morbidity during the preceding 12 months and to determine the prevalence of the use of peak flow meters and spacer devices by their children. At camp, children received educational sessions on asthma self-management, including training in the proper use of spacer devices and peak flow meters. Follow-up questionnaires were sent to the parents at 1 and 6 months after camp to assess the use of these devices and to measure subsequent asthma morbidity.

Results. Precamp use of spacer devices among all participants was 51.9%; the 1-month and 6-month postcamp use of spacer devices significantly increased to 92.4% ($P<.001$) and 85.9% ($P<.001$), respectively. The precamp use of peak flow meters was 50.0%; the 1-month and 6-month postcamp use was increased to 95.0% ($P<.001$) and 87.7% ($P<.001$), respectively. Six-month follow-up revealed a significant decrease in urgent outpatient visits for asthma exacerbations and a significant decrease in school day absences due to asthma.

Conclusions. An asthma camp is an effective environment for a patient education program emphasizing self-management skills. Children with moderate to severe asthma who attend such a camp may experience a decrease in subsequent asthma-associated morbidity.

Key words. Asthma; patient education, morbidity.
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Asthma prevalence, morbidity, and mortality have been increasing in the United States in recent years, especially among children. [1–7] The estimated prevalence of asthma among children in the United States increased by almost 40% from 1981 to 1988, making asthma a predominant cause of morbidity in childhood. Asthma accounts for 23% of all precollege school absences and is a leading cause of pediatric emergency department visits and hospitalizations.[8] During the 1980s, asthma hospitalization rates for children under 15 years old increased in the United States,[2] and overall, the age-adjusted death rate for asthma in the United States increased by 46%.[9] In 1990, the total health care costs for asthma were estimated at $6.2 billion, approximately 1% of the total health care expenditure for the nation.[10] Recognition of the continued significant social and economic impact of asthma has led the medical community to consider new management strategies emphasizing patient education.

Multiple studies indicate that patient education reinforcing self-management skills may be the ultimate answer to asthma management.[4,8,11,12] Ongoing patient involvement in controlling asthma symptoms has demonstrated a decrease in acute exacerbations.[13] Studies also suggest that educating asthmatic children about the dis-

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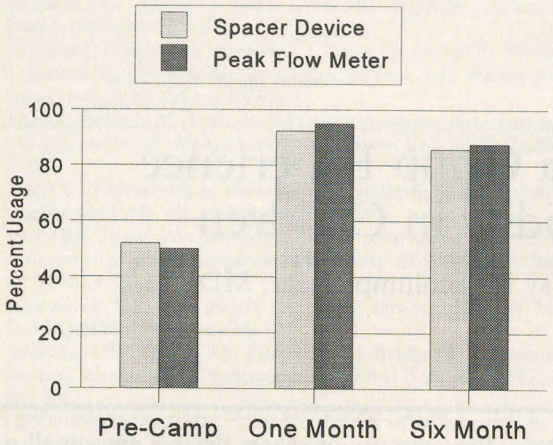

Figure 1. Precamp, 1-month postcamp, and 6-month postcamp use of spacer devices and peak flow meters. Data were obtained from precamp and postcamp questionnaires completed by the parents of camp participants. At both postcamp follow-up intervals, use of spacer devices and peak flow meters was significantly increased compared with precamp use (all P values $<.001$).

ease can have demonstrable long-term benefits, including improved independence and compliance and better control of asthma symptoms as perceived by parents.[8]

Two simple devices, the peak flow meter and the spacer device, are important tools in asthma self-management. The peak flow meter improves the asthmatic patient's ability to provide self-care by allowing objective and accurate self-assessment of asthma status.[14,15] The peak flow rate measured by the peak flow meter can be as much as 20% below normal before wheezing is detectable by auscultation with a stethoscope. The peak flow meter, therefore, allows early detection of deterioration in a patient's asthma status. The spacer device used with an inhaler improves the delivery of medication, especially in patients who cannot master proper techniques of using an inhaler or have forgotten how to use the device properly. This problem is particularly applicable to the pediatric population.[16–19]

Specialized asthma summer camps for children provide an ideal setting for asthma education in an enjoyable, relaxed, and nonthreatening environment with the added advantage of the group dynamic.[8] Such specialized camps were developed in the late 1960s to fill the need for a pleasant camping experience for children perceived to be too ill for a regular camp.[20] These camps allow children to participate in "normal" childhood activities, to put their illness into proper perspective, and to interact with children who have the same illness.[21–25]

This study examines whether an educational program emphasizing self-management skills can be successfully implemented in an asthma camp setting and evaluates the impact of an asthma camp experience on the subsequent morbidity of asthmatic children attending a summer asthma camp.

Methods

A cohort of 90 children between the ages of 6 and 12 years (average age 9.6, standard deviation [SD]±.6) who were attending an Asthma and Allergy Foundation of America (AAFA) summer asthma camp near Los Angeles, California, were enrolled in the study in July 1993. The study population consisted of 67.8% boys and 32.2% girls. The racial/ethnic distribution was as follows: 45.6% white, 26.7% African American, 12.2% Latino, 2.2% Asian–Pacific Islander, and 13.3% other. These children met AAFA criteria for moderate to severe asthma in that they required daily asthma medication. There was only a $5 application fee for enrollment and attendance at the week-long camp.

A precamp questionnaire was sent to the parents of these children to assess asthma morbidity in the 12-month period preceding camp (school absences, urgent outpatient visits, and hospitalizations), the prevalence of peak flow meter and spacer device use, and the level of understanding of the benefits of these devices in asthma self-management. At camp, children received daily 20-minute interactive educational sessions on the disease process of asthma, asthma triggers, asthma medications, the psychosocial factors of asthma, the proper use of spacer devices and peak flow meters, and the role of these devices in asthma self-management. Educational materials were sent to parents to review the use and benefits of these devices and to encourage their use with their children. Follow-up questionnaires were sent to parents at 1 and 6 months after the conclusion of summer camp to assess both the current use of spacer devices and peak flow meters in their children and asthma morbidity during the 6 months following camp attendance. Precamp and postcamp use of spacer devices and peak flow meters was compared by the McNemar's statistical test. Precamp and postcamp asthma morbidity was compared by the paired t test. All study questionnaires were mailed to the parents, and responses were collected by mail and telephone follow-up. Response rates for the precamp, 1-month postcamp, and 6-month postcamp questionnaires were 100%, 94%, and 89%, respectively.

Results

In the 6-month period preceding asthma camp, the average number of school day absences due to asthma was 6.3 (SD±9.3) with a range of 0 to 60. The average number of urgent outpatient visits for asthma exacerbations in the

same period was 3.5 (SD±3.7) with a range of 0 to 15. The total number of children who required hospitalization for asthma in the 6 months prior to asthma camp was 9, which represented 10.3% of our study population.

Figure 1 presents the precamp, 1-month postcamp, and 6-month postcamp use of spacer devices and peak flow meters. The precamp use of spacer devices among all camp participants was 51.9%; the 1-month and 6-month postcamp use of spacer devices was significantly increased at 92.4% ($P<.001$) and 85.9% ($P<.001$), respectively. The precamp use of peak flow meters was 50.0%; the 1-month and 6-month postcamp use of peak flow meters was increased to 95.0% ($P<.001$) and 87.7% ($P<.001$), respectively.

When evaluating changes in asthma morbidity, this study controlled for seasonal variation in asthma by comparing the 6-month period immediately after camp with the identical 6-month period in the preceding year. Figure 2 depicts the rates of asthma-associated morbidity during the 6-month follow-up period as compared with the 6 months immediately preceding the camp intervention and with the same-season 6-month period 1 year before the camp intervention. The number of urgent outpatient visits for asthma exacerbations and the number of school day absences due to asthma were both significantly lower during the 6 months following the camp intervention, compared with the two precamp 6-month periods. The average number of urgent outpatient visits for asthma exacerbations per child was only 1.54 visits for the period immediately following the camp intervention, compared with 3.46 ($P<.001$) and 5.17 ($P<.001$) visits for the periods immediately preceding the camp and the same-season period 1 year prior to camp. Similarly, the average number of school day absences per child due to asthma declined to 3.27 days for the period immediately following the camp intervention, compared with 6.10 ($P<.01$) and 6.78 ($P<.001$) days for the periods immediately prior to the camp and the same-season period 1 year prior to camp. The number of hospitalizations also declined during the 6-month postcamp period; however, this decline was significant only when comparing the same-season 6-month period preceding camp with the 6-month postcamp period (0.36 vs 0.11 hospitalizations per child, $P<.014$). This postcamp decrease in asthma-associated morbidity was not independently associated with the increased use of spacer devices or peak flow meters.

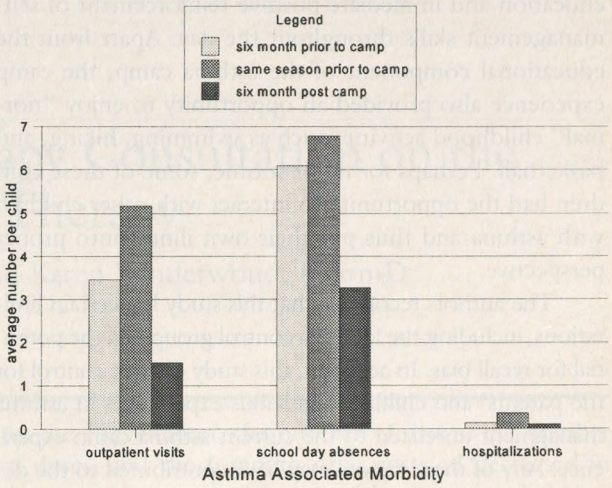

Figure 2. Asthma-associated morbidity during three 6-month periods: immediately preceding camp, same season 1 year prior to camp, and immediately following camp. Data were obtained from precamp and postcamp questionnaires completed by the parents of camp participants. Asthma-related urgent outpatient visits and asthma-related school day absences were both significantly decreased in the postcamp period as compared with the two precamp periods (P values range $<.01$ to $<.001$).

Discussion

This study found that a patient education program emphasizing asthma self-management skills can be effectively incorporated into an asthma summer camp setting. As evidenced by their increased use of spacer devices and peak flow meters during the 6-month postcamp period, the children in this study practiced the asthma self-management skills they had learned. These self-management skills were likely one of the factors in the camp experience that led to decreased asthma-associated morbidity, as demonstrated by lower rates of urgent outpatient visits for asthma and lower rates of school day absences due to asthma.

Other factors leading to the observed decreased asthma morbidity may have been the setting and methods by which education was completed. Asthma summer camps provide an ideal setting for asthma education. The outdoors provided a pleasurable and nonthreatening environment conducive to learning. Our asthma education focused not only on self-management skills using spacer devices and peak flow meters but also on the pathophysiology of asthma. This education was presented in such a manner that the children were active participants in their learning. Education methods included question-answer games, repetition, role playing, and demonstration-type activities. The education sessions were augmented with visual aids and written material created specifically for children. All children were also given their own spacer device and peak flow meter for use at camp as well as at home. In addition to the specific times allocated to asthma education on a daily basis, the camp setting permitted numerous opportunities for spontaneous asthma

education and immediate positive reinforcement of self-management skills throughout the day. Apart from the educational component of the asthma camp, the camp experience also provided an opportunity to enjoy "normal" childhood activities such as swimming, hiking, and basketball. Perhaps for the first time, some of these children had the opportunity to interact with other children with asthma and thus put their own illness into proper perspective.

The authors recognize that this study has certain limitations, including the lack of a control group and the potential for recall bias. In addition, this study did not control for the parents' and children's previous experiences in asthma managment unrelated to the current asthma camp experience. Any of these factors may have contributed to the decreased asthma morbidity observed following the camp.

Although not analyzed specifically in this study, the psychological benefits of the camp were apparent, as evidenced by conversations with the parents and by parental comments written on the returned questionnaires. These psychological benefits included improved self-confidence, greater independence in asthma management, and an overall sense of better asthma control.

Family physicians providing primary care to patients of all ages are in a unique position to reduce rising asthma morbidity and mortality rates through patient education in a variety of settings. Patient education may also prove to be a cost-effective strategy in caring for asthmatic patients. Further studies are needed to determine whether asthma education programs in other settings and with other age groups would have similar favorable outcomes.

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