

Use of Anti-inflammatory Medications by Urban Adolescents with Asthma

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ABSTRACT

The National Heart, Lung, and Blood Institute has issued guidelines recommending the use of anti-inflammatory medications in all patients with persistent asthma. Little is known about adherence to these guidelines in asthmatic adolescents. To examine the patterns of asthma severity and the use of anti-inflammatory medications among adolescents with asthma, we employed a multi-staged stratified sample approach at a high school located in the Bronx, New York. First, an asthma screening survey was administered to 3,800 registered students, ages 13 to 18 years. Then, we identified a subset of 200 children who answered "yes" to all of the following questions: 1) does your doctor think that you have asthma, 2) do your parents think that you have asthma, and 3) do you think that you have asthma? Next, a self-completion questionnaire was administered to a sample drawn from this cohort. Subjects were surveyed regarding severity of asthma symptoms, use of anti-inflammatory medications, and demographic information. Differences in proportion were tested by Chi-square analyses or Fisher's exact test, as appropriate. One hundred sixty subjects participated. Sixty-three percent of respondents were female, 68% were Hispanic, and 26% were African American. Thirty-three percent had weekly symptoms, and 14% had daily symptoms. Only 33% of adolescents with daily symptoms and 24.5% of those with weekly symptoms were on inhaled steroids. However, those with daily symptoms were significantly more likely to be on anti-inflammatory medications compared to subjects with monthly symptoms (33% vs. 6.5%, $p = 0.001$). These data show that the majority of adolescents with persistent asthma were not on daily steroids in accordance with the National Heart, Lung, and Blood Institute guidelines

INTRODUCTION

Asthma is a widespread problem among pediatric populations affecting 4.8 million children in the United States (Adams and Marano, 1995). The problem is of particular significance in urban areas such as the Bronx, New York, where the asthma prevalence among children is twice the national average (Gergen and Weiss, 1990). In addition, at least one study has revealed poor adherence with the National Heart, Lung, and Blood Institute

(NHLBI) Guidelines in inner city children with asthma—with only 39% of children with persistent symptoms using daily anti-inflammatory medications (Warman et al., 1999). The NHLBI guidelines recommend the use of anti-inflammatory medications, specifically inhaled steroids, for all patients with persistent asthma symptoms. Studies have documented sub-optimal physician adherence to these guidelines (Cabana et al., 2000; Finkelstein et al., 2000; Cabana et al., 2001). Physicians have identified several barriers to the use of anti-inflammatory medications, including lack of agreement with the guideline, lack of confidence in dosing, lack of confidence in recognizing adverse reactions, and concerns about growth retardation (Cabana et al., 2000; Finkelstein et al., 2000; Cabana et al., 2001). Little is known about the use of anti-inflammatory medications among adolescents with asthma. Thus, we examined the patterns of asthma severity and the use of anti-inflammatory medications among adolescents with asthma in an urban High School.

METHODS

Subjects and Setting

We conducted a multi-staged stratified survey in October of 2000 at a high school in the Bronx, New York, where 57% of the students were Latino, 35% were African-American, and 3% were White. Eighty-three percent of students at this school were from families with incomes at or below 130% of the Federal poverty level.

First, a questionnaire to screen for asthma was developed, piloted, and modified. Then, we conducted a survey of 3,800 registered students (13 to 18 years of age). Based on the results of the screening survey, we identified a subset of 200 children with the most positive screening results for asthma. These were defined as subjects who answered "yes" to all of the following questions: 1) does your doctor think that you have asthma, 2) do your parents think that you have asthma, and 3) do you think that you have asthma?

Sampling and Data Collection

To assess asthma severity and the use of anti-inflamma-

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TABLE 1 | COMPARISON OF MEDICATION USE BY SEVERITY OF ASTHMA SYMPTOMS.

Variable	% Subjects Using Medication			p Value
	Daily Symptoms	Weekly Symptoms	Monthly Symptoms	
Bronchodilator	73%	70%	71%	0.850
Inhaled Steroid	33%	24%	6.5%	0.001*
Other Anti-inflammatory (E.g., cromolyn, montelukast)	8%	10%	6%	0.770

tory medications, we developed, piloted, and modified a self-completion questionnaire. This questionnaire was administered to the cohort of children with the most positive screening results for asthma. Feasibility was discussed and logistics were arranged with the High School administration through several meetings. Students were located by their class schedules and assembled in a school auditorium to complete the questionnaire. The investigators distributed and collected all questionnaires. Of the 200 students targeted, 160 were present in school. All of these 160 students completed a questionnaire.

Subjects were surveyed regarding severity of asthma symptoms (i.e., frequency of asthma symptoms, medical visits, and prescribed medications for asthma). Subjects listed the number and names of physician-prescribed medications that they took for their asthma. We also inquired whether each listed medication was used to relieve an asthma attack (e.g., rescue medication) or was used on a daily basis to prevent an asthma attack (e.g., control medication).

We obtained demographic information regarding participant's age, sex, ethnicity, and immigration (e.g., defined as birth in or prior residence in a country other than the United States).

Statistical Analysis

Differences in proportions were tested by Chi-square or Fisher's exact test as appropriate for dichotomous variables. Data were maintained in SPSS 10.0 statistical software (SPSS Inc., Chicago, IL).

RESULTS

Of the 200 subjects identified, 160 (80%) completed the survey. Sixty-three percent of respondents were female.

Of the respondents, 68 percent were Hispanic, 26% were African American, and 6% were White. Twenty-four percent were immigrants. The mean age of the respondents was 15.7 years old. Assessment of asthma severity revealed that 72% of respondents had symptoms of asthma at least once per month, 33% had weekly symptoms of asthma, and 14% had daily symptoms of asthma. Overall, 73% of adolescents with daily asthmatic symptoms reported using daily rescue medications. Of these, 86% were able to recall the names of their rescue medications.

Contrary to the NHLBI guidelines, only 33% of subjects with daily symptoms reported using inhaled steroids (Table 1). Of those with weekly symptoms, only 24.5% reported using inhaled steroids. However, when compared to subjects with monthly symptoms, adolescents with daily symptoms were more likely to use inhaled steroids, as were subjects with weekly symptoms (Table 1).

DISCUSSION

These data show that the majority of adolescents with persistent asthma were not on daily steroids in accordance with the NHLBI guidelines. Anti-inflammatory medicines, like inhaled steroids, are key in the prevention of chronic symptoms and of asthma exacerbation, but they were not being used by two-thirds of adolescents with daily symptoms and by three-quarters of those with weekly symptoms who participated in this study. However, we found that subjects with more persistent symptoms were more likely to be on preventive medications than those with less severe asthma.

This study has the limitation of being a self-report study. We did not independently verify the information reported by subjects. This is a limitation of all self-report studies. Also, our data did not allow us to determine

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whether the sub-optimal use of anti-inflammatory medications was because physicians were not prescribing the appropriate medications or whether it was because adolescents were not adherent with prescribed medications. We attempted to address this issue by asking participants to indicate if they were taking any other physician-prescribed medications, even if they could not recall the name of the medicine. Of those subjects who should have been on anti-inflammatory medications but were not, almost none reported the use of "another medicine" besides a rescue medication. Thus, we speculate that the observed poor adherence with use of anti-inflammatory medication derived from physician behaviors primarily. Although some studies have documented poor patient adherence to national asthma guidelines (Warman et al., 1999; Scarfone et al., 2001), several studies have shown sub-optimal physician adherence with the NHLBI guidelines as a barrier to asthma care (Cabana et al., 2000; Finkelstein et al., 2000; Cabana et al., 2001).

The findings of this study have some implications. Further education of clinicians and families may be needed to emphasize the importance of daily, preventive anti-inflammatory medication in the long-term care

of persistent asthma in adolescents. There is a need to increase adherence to this critical tenet of the NHLBI guidelines.

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