Predicting Future Asthma Morbidity in Preschool Inner-City Children


PURPOSE OF THE STUDY. To determine which clinical and environmental factors are predictive of poor long-term asthma control in preschool inner-city children.

STUDY POPULATION. Preschool inner-city children with a history of persistent asthma.

METHODS. Baseline characteristics determined to be potential predictors of asthma severity were examined: demographics, asthma symptoms, medication use, healthcare utilization, early life medical history, family history, allergen exposure and allergic disease, and pollutant exposure. Bivariate and multivariate analyses were performed by using logistic regression to examine the association of predictors of asthma severity with healthcare utilization at 2 years.

RESULTS. Of the 150 children at baseline, the follow-up rate was 83% at 2 years; therefore, 124 children were included in final analyses. At baseline, the mean age was 4.4 years, and participants were predominantly African-American (90%). Most of the children were atopic, and 32.5% reported using inhaled corticosteroids. Nighttime awakening from asthma and a history of pneumonia may deserve closer monitoring to prevent future poor control.

CONCLUSIONS. Preschool children with nighttime awakening from asthma and a history of pneumonia may deserve closer monitoring to prevent future asthma morbidity.

REVIEWER COMMENTS. The authors offer very important insights into the clinical presentation of asthma for young preschoolers and longitudinal outcomes. By identifying simple clinical clues, including nocturnal waking and a history of recurrent pneumonia, this study allows the clinician to triage high-risk asthmatic children within the context of an examination or clinic visit. These tools allow for further coordination of both asthma education and more aggressive medical intervention to reduce the morbidity and burden these children face due to their asthma.

Urinary Bromotyrosine Measures Asthma Control and Predicts Asthma Exacerbations in Children


PURPOSE OF THE STUDY. To determine the usefulness of urinary bromotyrosine, a marker of eosinophil-catalyzed protein oxidation, in monitoring asthma control and predicting future exacerbations.

STUDY POPULATION. There were 57 people enrolled from the Cleveland Clinic with a diagnosis of asthma between the ages of 5 and 21 years. Recruitment occurred from July to September 2006 and follow-up from August to November 2006. All subjects were considered to be at baseline status and being seen as part of regularly scheduled visits. Those with other comorbid conditions were excluded.

METHODS. Asthma Control Questionnaires (ACQ6) were used to assess asthma control given at the initial study encounter and at a 6-week follow-up. Spirometry was performed, and exhaled nitric oxide was measured. Spot clean catch urine samples were collected to determine free bromotyrosine levels by stable isotope dilution high-performance liquid chromatography with online mass spectrometry. Charts were reviewed for medical history, medication, and laboratory results.

RESULTS. Urinary bromotyrosine levels correlated significantly with indexes of ACQ6 at baseline and at follow-up. This correlation was not seen with respect to nitric oxide levels, spirometry, and blood metrics (immunoglobulin E, eosinophil count). Participants with higher baseline levels of urinary bromotyrosine were 18.1-fold more likely to have inadequately controlled asthma and fourfold more likely to have an asthma exacerbation during the study period.

CONCLUSIONS. Urinary bromotyrosine significantly correlates with measures of asthma control and is a good marker for predicting the risk of future asthma exacerbations in children.

REVIEWER COMMENTS. Based on findings from this study, using urinary bromotyrosine levels as an objective marker for asthma control and in predicting risk for future exacerbations seems promising. However, the cost of such studies given its availability in select laboratories may be a limiting factor and deterrence in its widespread use, and confirmatory studies are needed.

A Randomized Trial of Air Cleaners and a Health Coach to Improve Indoor Air Quality for Inner-City Children With Asthma and Secondhand Smoke Exposure


PURPOSE OF THE STUDY. To compare an intervention by using air cleaners and health coach intervention to reduce secondhand smoke (SHS) exposure, particulate matter (PM), air nicotine, and urine cotinine concentrations, and
to increase symptom-free days (SFDs) in children with asthma residing with a smoker.

STUDY POPULATION. The study enrolled children ages 6 to 12 years with a physician diagnosis of persistent asthma who were living with a smoker (>5 cigarettes a day).

METHODS. This was a randomized 3-arm controlled trial. All study groups received asthma education over 4 nurse-home visits. Study groups included (1) the control group (high-efficiency particle air cleaners were placed in the home after the final home-monitoring visit), (2) the air cleaner group (air cleaners were placed in the home for 6 months), and (3) the air cleaner plus health coach group (air cleaners for 6 months and a behavioral intervention). Changes in PM, air nicotine, and urine cotinine concentrations as well as SFDs were measured, and the child’s SHS exposure was evaluated based on the caregiver’s report of smoking frequency.

RESULTS. Changes in mean fine and coarse PM (PM$_{2.5}$ and PM$_{2.5-10}$) concentrations (baseline to 6 months) were significantly lower in both air cleaner groups compared with the control group (mean differences for PM$_{2.5}$ concentrations: control, 3.5 µg/m$^3$; air cleaner only, −19.9 µg/m$^3$; and air cleaner plus health coach, −16.1 µg/m$^3$ [P = .003]; and PM$_{2.5-10}$ concentrations: control, 2.4 µg/m$^3$; air cleaner only, −8.7 µg/m$^3$; air cleaner plus health coach, −10.6 µg/m$^3$ [P = .02]). SFDs were significantly increased in both air cleaner groups compared with the control group (P = .03). No differences were noted in air nicotine, urine cotinine concentrations, or SHS exposure measures. The health coach provided no additional reduction in PM concentrations.

CONCLUSIONS. Use of air cleaners in homes of children with asthma was associated with significant reduction in PM concentrations and increase in SFDs. The reduced PM levels were not sufficiently decreased to meet the US Environmental Protection Agency’s standards for outdoor air quality. Although the use of air cleaners resulted in significant reduction in PM concentrations and an increase in SFDs, it was not enough to decrease exposure to SHS.

REVIEWER COMMENTS. This study suggests that the use of air cleaners may be helpful in the reduction in indoor PM concentrations and in increasing SFDs, which may be a viable intervention suggestion for the homes of urban children with asthma who live in homes with smokers. The authors suggest that use of high-efficiency particle air cleaners is a more cost-effective approach compared with treatment with a leukotriene modifier, which revealed similar increases in SFDs in other studies. However, further studies are needed that take into account adherence to use of air cleaners and for SHS exposures outside the home. Of course, implementing a smoke-free home policy should be first considered ideally, especially in the homes of children with asthma.

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Written Action Plan Use in Inner-City Children: Is It Independently Associated With Improved Asthma Outcomes?

PURPOSE OF THE STUDY. To determine the independent effect of a written action plan (WAP) on asthma outcomes in patients with poorly controlled asthma.

STUDY POPULATION. Study patients were aged 3 to 13 years and were part of the Healthy Homes II study, a randomized controlled cohort trial that enrolled 309 low-income children with poorly controlled or persistent asthma from the Seattle area from 2002 to 2004.

METHODS. Data were collected for primary outcomes, including the control of asthma in the previous 2 weeks and pediatric caregiver quality of life scores. Secondary outcomes measured were unscheduled visits to a clinic, emergency department, or hospital within the last 3 months. Information was gathered about whether they had a WAP available and whether they used the WAP over a year-long period. Patients were classified as users of the WAP if they used it at least once per week.

RESULTS. A total of 251 patients took part in the study; 112 used the WAP. No differences in asthma outcomes were seen between patients who used the WAP and those who did not. No difference was seen in use of urgent health care services or in caregiver quality of life scores.

CONCLUSIONS. In this study, the use of a WAP was not independently associated with improved asthma outcomes in this cohort of low-income children who had poorly controlled asthma.

REVIEWER COMMENTS. Education of patients and families affected by asthma is essential. Use a WAP in the treatment of patients who have asthma is recommended by national guidelines. This study reminds us that the WAP, although important, is only a part of the treatment plan that is given to patients and their families. One of the many assets WAPs have is that they give some control over the treatment to the patients and their families. The response by the caregivers is an essential part, and the need exists to study this factor in a larger population among different socioeconomic groups.


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