Anxiety Contributes to Poorer Asthma Outcomes in Inner-City Black Adolescents

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BACKGROUND: The factors associated with poor asthma control, exacerbations, and health care utilization in black adolescents are complex and not well understood. Although psychological comorbidities such as anxiety are common in patients with asthma, these have not been studied in this population.

OBJECTIVE: This study characterized anxiety and associated asthma features in a cohort of black inner-city adolescents with persistent asthma and determined the association between anxiety symptoms, persistent uncontrolled asthma, and prospective health care utilization over 1 year.

METHODS: Eighty-six black adolescents were enrolled, phenotyped, and screened for anxiety symptoms with the Hospital Anxiety and Depression Scale anxiety subscale (HADS-A). Participants were telephoned every 2 months and a second study visit was completed at 1 year. Primary outcomes included persistent uncontrolled asthma, asthma exacerbations requiring systemic corticosteroids, and unscheduled health care utilization during the 1-year study period.

RESULTS: A total of 31% (n = 27) of adolescents had probable anxiety (ie, HADS-A score >7) and 27% (n = 23) had possible anxiety (ie, HADS-A score 5-7) at the baseline visit. Anxiety symptoms were associated with poorer asthma control, more impaired quality of life, and more insomnia symptoms. Adolescents with probable anxiety disorders also had increased odds of persistent uncontrolled asthma and emergency department utilization, with no differences in physician visits or systemic corticosteroid receipt.

CONCLUSIONS: Inner-city black adolescents with persistent asthma have a high prevalence of anxiety symptoms associated with poorer asthma control, impaired quality of life, insomnia, and increased prospective emergency department utilization for asthma. Routine screening for anxiety disorders may be useful in the clinical management of adolescents with asthma.

How does this study impact current management guidelines? Routine screening for anxiety disorders may be useful in the clinical management of inner-city black adolescents with asthma and may help identify subgroups at risk for poorer asthma outcomes.

What is already known about this topic? Comorbid psychiatric disorders including anxiety are common in patients with asthma and contribute to poor control and increased costs. Anxiety has not been studied in black adolescent asthma populations at high risk for adverse asthma outcomes.

What does this article add to our knowledge? Nearly one-third of inner-city black adolescents with persistent asthma have probable anxiety disorders that are associated with poorer asthma control, impaired quality of life, insomnia, and increased emergency department utilization for asthma.

Key words: Asthma control; Asthma exacerbation; Mental health; Adolescent; Anxiety
mental health disorders in US youth,

Another study focused on the relationship between anxiety and asthma in children and adolescents aged 6 to 18 years.

**Methods**

Self-reported black adolescents aged 12 to 21 years were recruited for the study through community-based advertisements across metropolitan Atlanta, Georgia. Inclusion criteria were ability to read and speak English, a physician diagnosis of asthma, and either 12% or more reversibility in the FEV1, after bronchodilator administration or airway hyperresponsiveness to methacholine, evidenced by a provocative concentration of methacholine (≤16 mg/mL). Exclusion criteria included premature birth before 35 weeks of gestation or other comorbid airway disorders such as aspiration or vocal cord dysfunction. Permission to proceed with this study was granted by the Emory University Institutional Review Board. Informed written consent and assent were obtained.

**Study design and procedures**

Participants completed a baseline study visit and a second study visit at 1 year. Study visits were postponed if participants were acutely ill or if an asthma exacerbation treated with systemic corticosteroids was reported within the preceding 4 weeks. Between visits, participants were telephoned every 2 months to assess for adverse events. Spirometry (KoKo PDS, Ferraris, Louisville, Colo) was performed at baseline and after bronchodilator reversibility testing with 4 inhalations of albuterol sulfate (90 µg per inhalation). Participants withheld short-acting bronchodilators for 4 hours and long-acting bronchodilators for 12 hours before spirometry testing. The best of 3 forced vital capacity maneuvers was interpreted according to population reference equations.27 Allergy skin prick testing was performed after a 3-day antihistamine withhold using 12 allergen extracts: tree mix (Quercus alba, Ulmus americana, Platanes acerifolia, Salix caprea, Populus deltoidea), grass mix (Cynodon dactylon, Lolium perenne, Phleum pratense, Poa pratensis, Sorghum halepense, Psalpum notatum), weed mix (Artemisia vulgaris, Chrysanthemum leucanthemum, Taraxacum vulgare, Solidago virgaurea), common ragweed (Ambrosia artemisiifolia), Alternaria alternata, Aspergillus fumagalis, Cladosporium herbarum, dog dander, cat dander, German cockroach (Blatella germanica), Dermatophagoides farinae, and Dermatophagoides pteronyssinus (Greer Laboratories, Lenoir, NC). Histamine and saline served as positive and negative controls, respectively. Test results were considered positive if a wheal of 3 mm diameter or greater and flare of 10 mm or more was present 15 minutes after application. Exhaled nitric oxide concentrations were measured online (NIOX MINO, Circrassia Pharmaceuticals, Chicago, Ill) according to recommended standards.28 Demographic and medical history questionnaires, the Hospital Anxiety and Depression Scale (HADS),29 the Asthma Control Test (ACT),29 the Asthma Quality of Life Questionnaire (AQLQ),30 and the Insomnia Severity Index,31 were also completed. Neighborhood characteristics were obtained from the 2010-2014 American Community Survey available at www.factfinder.census.gov.32 Crime rates were obtained from the Federal Bureau of Investigation, local police departments, and municipalities and were accessed through the City Profile feature available at www.moving.com.

**Anxiety classification and primary outcome measures**

Participants were classified into 3 groups according to baseline HADS anxiety subscale (HADS-A) scores as follows: (1) no anxiety (HADS-A score <5), (2) possible anxiety (HADS-A score 5-7), and (3) probable anxiety (HADS-A score >7).26,33 Primary outcome measures at the 1-year visit included persistent uncontrolled asthma defined by an ACT score of 19 or less29 at both visits, receipt of systemic corticosteroids for an asthma

**Abbreviations used**

ACT- Asthma Control Test
AQLQ- Asthma Quality of Life Questionnaire
HADS- Hospital Anxiety and Depression Scale
HADS-A- Hospital Anxiety and Depression Scale, Anxiety subscale
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