Reducing asthma health disparities in poor Puerto Rican children: The effectiveness of a culturally tailored family intervention

Glorisa Canino, PhD,[a] Doryliz Vila, MS,[a] Sharon-Lise T. Normand, PhD,[b] Edna Acosta-Pérez, PhD,[a] Rafael Ramírez, PhD,[a] Pedro García, MA,[a] and Cynthia Rand, PhD[c] *San Juan, Puerto Rico, Boston, Mass, and Baltimore, Md*

Background: Island and mainland Puerto Rican children have the highest rates of asthma and asthma morbidity of any ethnic group in the United States.
Objective: We evaluated the effectiveness of a culturally adapted family asthma management intervention called CALMA (an acronym of the Spanish for "Take Control, Empower Yourself and Achieve Management of Asthma") in reducing asthma morbidity in poor Puerto Rican children with asthma.
Methods: Low-income children with persistent asthma were selected from a national health plan insurance claims database by using a computerized algorithm. After baseline, families were randomly assigned to either the intervention or a control group.
Results: No significant differences between control and intervention group were found for the primary outcome of symptom-free days. However, children in the CALMA intervention group had 6.5% more symptom-free nights, were 3 times more likely to have their asthma under control, and were less likely to visit the emergency department and be hospitalized as compared to the control group. Caregivers receiving CALMA were significantly less likely to feel helpless, frustrated, or upset because of their child's asthma and more likely to feel confident to manage their child's asthma.
Conclusion: A home-based asthma intervention program tailored to the cultural needs of low income Puerto Rican families is a promising intervention for reducing asthma morbidity. (J Allergy Clin Immunol 2008;121:665-70.)

Key words: *Family asthma management intervention, controlled clinical trial, Puerto Rican, children*

Abbreviations used
ED: Emergency department
IDR: Incidence density ratio

Asthma is the most common chronic childhood illness, and minority groups are disproportionately affected by asthma.[1] Mainland and island Puerto Rican children have the highest rates of asthma of any ethnic group and are more likely to die because of their asthma compared with other children.[2-7] Numerous factors have been implicated in explaining the higher rates of asthma and morbidity among minority children, yet the factors accounting for this disparity are poorly understood. Poor adherence and inadequate overall asthma management by disadvantaged minority families have been linked to elevated asthma morbidity, service utilization, poor quality of life, and even asthma deaths in children.[8-9] Because poor asthma management is one of the contributing factors to this excess morbidity, family management and educational interventions are needed to reduce the observed disparity in health and health care.

Treatment recommendations for asthma can be complex, including multiple medications, symptom monitoring, and environmental control precautions. Educational and behavioral interventions designed to help families develop the skills necessary to manage their child's asthma have been shown to improve family asthma management practices and reduce children's asthma morbidity (see reviews[10,11]).

Although family asthma management interventions have been tested in samples that include mainland Latinos,[12-14] separate analyses for the effectiveness of the intervention in Latino populations have not been provided, and none have been tested for island Puerto Rican families and children. The cultural adaptation and testing of a family-based intervention can provide important information about how to establish successful interventions in communities with different customs and cultures.[15] In this article, we present the results of a randomized controlled clinical trial study to test the effectiveness of a culturally adapted family-based intervention called CALMA developed for reducing asthma morbidity in poor Puerto Rican children (age 5-12 years) with persistent asthma. To our knowledge, this is the first family-based asthma intervention focused on reducing health care disparities among minority low income Puerto Rican children.

METHODS

Participant selection and screening

Children were enrolled from 2 health regions under the government of Puerto Rico Health Insurance Administration Agency Plan and received

From [a]the University of Puerto Rico, Medical Sciences Campus, Behavioral Sciences Institute; [b]the Department of Health Care Policy, Harvard Medical School, Boston; and [c]the Johns Hopkins School of Medicine, Baltimore.

Supported by National Institutes of Health grant #P20 MD000537-01 funded by the National Center for Minority Health and Health Disparities and by National Institutes of Health Research grant #1P50 MHO 73469-01 funded by the National Institutes of Health.

Disclosure of potential conflict of interest: The authors have declared that they have no conflict of interest.

Received for publication June 14, 2007; revised October 9, 2007; accepted for publication October 15, 2007.

Available online December 3, 2007.

Reprint requests: Glorisa Canino, PhD, Behavioral Science Research Institute, Medical Sciences Campus, University of Puerto Rico, PO Box 365067, San Juan, PR 00936-5067. E-mail: gcanino@rcm.upr.edu.

0091-6749/$34.00

doi:10.1016/j.jaci.2007.10.022

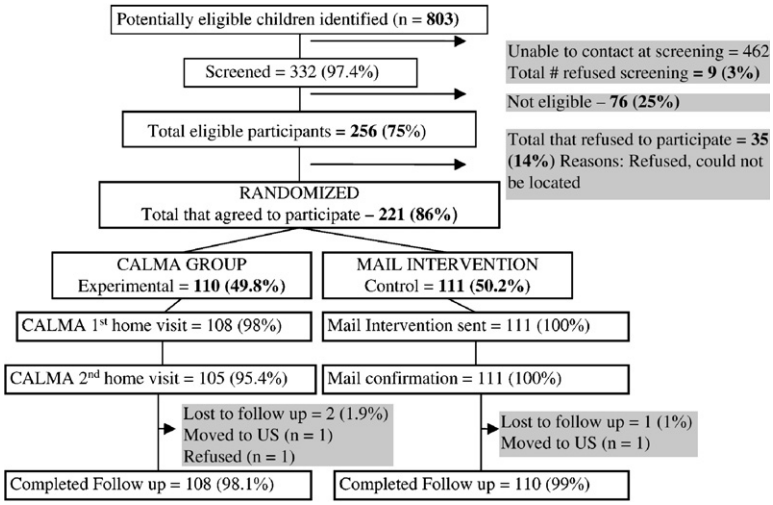

FIG 1. Recruitment of participants to the study.

asthma-related services during fiscal year 2004 to 2005. The agency requires that the family be at most 100% above the poverty level to be eligible (the poverty level is $400). To determine eligibility, the agency considers the number of household members and their total monthly income and adds $190 for each additional member.

Families identified using the claims data set were asked to complete a screener questionnaire. The children and their families were selected to participate in the study by using a computerized claims data algorithm based on the Health Plan Employer Data and Information Set criteria for classifying children with persistent asthma.[16] The criteria required that the child had at least 1 claim with diagnostic code for asthma or reactive airway disease (International Classification of Diseases, Ninth Revision, diagnostic code 493.xx) and over a 1-year period had either been hospitalized or had at least 2 emergency department (ED) visits or 3 to 5 ambulatory visits caused by asthma or used asthma medications from 2 of the following therapeutic categories: anticholinergics, cromolyn, sympathomimetics, steroid inhalants, methylxanthines, leukotriene inhibitors, or corticosteroids.

Eligibility criteria for selection after screening were (1) families with a child between the ages of 5 and 12 years; and (2) poor asthma control, as defined by any of the following in the last 4 weeks: (a) use of any asthma medication more than once a week, (b) experiencing asthma symptoms such as wheezing, tightness of chest, problems coughing, or waking up at night because of asthma either daily or continuously, (c) using the emergency department 2 or more times during the last 4 weeks, and (d) using oral steroids or having been hospitalized in the last year. Exclusion criteria were (1) currently participating in another asthma study, (2) being the sibling of a selected child, and (3) no appropriate address for follow-up in the claims data. At the time of screening, the caregiver was defined as the adult legally responsible for the child and was the only person authorized to complete the screening procedure. Children were screened from April 1 to June 30, 2006, the baseline interview was conducted from April 17 to June 28, 2006, and the follow-up was conducted from August 17, 2006, to October 27, 2006.

Recruitment and randomization

Of the 803 children 5 to 12 years of age who met the Health Plan Employer Data and Information Set claims criteria, 341 (42.5%) had updated contact information (Fig 1). Of these, 332 (97.4%) consented to be screened, and 256 (75%) met eligibility criteria for participation in the study. Of the eligible children, 221 (86%) were enrolled in the study and completed baseline information. Children were randomized into the CALMA (N = 110) or control group (N = 111) by using a computerized algorithm based on a mixed block randomization scheme. Groups of subjects of different sizes (blocks) were assigned either to the experimental or control group according to a previously specified proportion within each block.

Description of intervention and control conditions

The main goal of CALMA is to improve asthma outcomes by educating families about asthma self-management. Asthma counselors are trained to deliver 8 asthma education modules based on an evidenced-based educational program developed elsewhere[17] and modified by investigators at John Hopkins University and our team of researchers. These 8 modules were delivered over the course of 2 home visits with telephone contacts for ongoing follow-up and reinforcement of recommended plans and home assignments. The interval mean time between the first and second intervention was 18.4 days. No further intervention was administered between the second intervention and follow-up evaluation. The modules were intended to achieve the following goals: help the patients/family (1) understand the nature (chronicity) of asthma, (2) identify and overcome barriers to care and to appropriate medication use, (3) better understand and use the types of medications, (4) appropriately use the health care system and keep follow-up appointments, (5) enhance use of action plans, (6) improve identification of asthma triggers and environmental avoidance techniques, (7) encourage identification of onset of symptoms and early management, (8) assume an active role in the communication with the provider, (9) identify the stressors that may affect the psychological well being of the parent and learn when and where to look for psychological and family therapy help, and (10) provide a culturally competent environment in which the family feels understood and free to share cultural beliefs and practices. All families were given a manual to keep as a reference for the material taught in the 2 sessions. The intervention was culturally adapted using a collaborative participatory research approach that involved all affected partners in the research process.[18] We collaborated with several community partners—health educators and mothers of children with asthma—in adapting the evidence-based intervention to the needs of the community. Cultural adaptations included the inclusion of common practices and myths that Puerto Rican parents have about asthma, proper use of home remedies, culturally congruent pictures, and common asthma triggers in the island, such as Sahara dust and eruptions from Caribbean volcanoes. New educational material was developed related to coping with marital and family stress resulting from the consequences of the child's asthma, increasing parental empowerment to deal with the Puerto Rican health system, and educating parents how to teach their child and others how to manage asthma.

The control group received 5 flyers of educational materials that contained information about the following topics: a description of control and rescue medications, when to use them and their benefits, information about what asthma is, common allergens and triggers and how to prevent episodes, how to take care of asthma equipment, and common foods that may be allergenic.

Preserving fidelity of intervention

Fidelity of the intervention was maintained by standardizing the intervention using a portfolio the asthma counselor carried to the homes, and by strict