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Asthma in Children of Caribbean Descent Living in the Inner-City: Comparing Puerto Rican and Afro-Caribbean Children

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Abstract

Ethnic minority children bear a disproportionate amount of the U.S. asthma burden. We compared asthma morbidity and pulmonary function (%FEV₁) in two Caribbean groups living in the Bronx, NY: Puerto Rican and Afro-Caribbean children. Caregiver-child dyads (Puerto Rican: $n=113$, $M_{age}=9.89 \pm 2.05$; Afro-Caribbean: $n=47$, $M_{age}=10.35 \pm 2.08$) responded to sociodemographic and asthma-related questions, and children's %FEV₁ was measured. Puerto Rican children had significantly greater (past year) asthma morbidity, yet there were no significant differences in %FEV₁. This discrepancy between objective pulmonary function and asthma morbidity suggests the importance of considering sociocultural factors in pediatric asthma care.

Keywords

Asthma; Caribbean Immigrants; Pediatrics

Introduction

Asthma is one of the most common chronic childhood illnesses in the United States, with the Bronx having some of the greatest prevalence, morbidity, and mortality (New York State Department of Health, 2013). Minority children, particularly Puerto Rican and non-Latino Black children, have poorer asthma outcome compared to Caucasian children (Crocker et al., 2009; Esteban et al., 2009; Koinis-Mitchell et al., 2008). Compared to both other Latino and Caucasian individuals, Puerto Ricans have the highest asthma prevalence (American Lung Association, 2012), thus continuing to research this population is important. Less is known about Afro-Caribbean children as a discrete group, as in research they are often subsumed into the group of African Americans (Williams et al., 2007). Yet, Afro-Caribbeans differ from African Americans in terms of ethnic identity (Carlisle, 2012), beliefs (Archibald,

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2011), and at times health outcomes (Davis & Huffman, 2007), suggesting research focused on Afro-Caribbeans as a discrete group may be warranted.

Due to the poor outcomes reported in minority populations, this study compared asthma morbidity in the past year and pulmonary function in two groups residing in a similar area in the Bronx, Puerto Rican and Afro-Caribbean (excluding Puerto Rican) children. It was hypothesized that Puerto Rican children would have worse outcomes. This aim of this study is consistent with the National Heart Lung and Blood Institute (2007) which highlights the importance of plans of care which take into account the “cultural and ethnic factors...of each patient and family (NHLBI, 2007).”

Methods

Participants

A convenience sample of participants was recruited as part of two larger studies on pediatric asthma symptom perception (Feldman et al., 2012; Feldman et al., 2013). Recruitment was conducted through mailings and from hospital clinics. This study focused on 160 caregiver-child dyads who were: English or Spanish speaking; asthma diagnosis confirmed through medical chart review; reported active asthma symptoms within the past year; ages 7–15; primary caregiver self-identifying as Puerto Rican, Puerto Rican American, or of Afro-Caribbean origins who had resided with the child at least 9 of the past 12 months. Exclusion criteria included children: with vocal cord dysfunction; cognitive disabilities that affected following the protocol; who could not perform spirometry.

Procedure

This study was approved by the IRB of Albert Einstein College of Medicine. Participants provided informed consent (caregivers) and assent (children) and received monetary compensation (\$70) for their participation. At a primary assessment session self-report measures were administered and spirometry performed, with additional demographic information collected at a follow-up session.

Measures

Demographic information was collected via self-report. Caregivers were categorized as Puerto Rican if they traced their ancestry to Puerto Rico. Their races were varied, consistent with research indicating Puerto Ricans often identify their race as “Puerto Rican” as opposed to the U.S. census categories (Landale & Oropesa, 2002). Individuals were categorized as Afro-Caribbean if they traced their origins to a Caribbean country, identified their race as black, and did not identify as Puerto Rican. Children’s ethnicity was based on their caregivers’, as the larger research studies were focused on the role of the cultural environment children were raised in.

Caregivers responded to questions on the Asthma Functional Severity Scale (good reliability) in English (Rosier et al., 1994) or Spanish (Koinis-Mitchell et al., 2007). The continuous measure assessed frequency of asthma symptoms and activity limitations on six items, with higher scores indicating greater asthma morbidity. Caregivers also reported

number of asthma-related school absences, doctor visits, and emergency department visits. Only visits due to asthma symptomatology, not preventive care were reported.

Trained research assistants conducted spirometry (nSpire Health, Inc., Longmont, CO) in accordance with national and international standards (American Thoracic Society, 1995; Miller et al., 2005). Pulmonary function was determined by percent predicted forced expiratory volume in one second (%FEV₁) based on norms established from the National Health and Nutrition Examination Survey (NHANES III) with Puerto Rican children coded as Caucasian and Afro-Caribbean children coded as African American (Hankinson, Odencrantz, & Fedan, 1999). It is recommended that reference values be based on self-identification of racial/ethnic background (Pellegrino et al., 2005). Pulmonary data from seven-year-olds were not included, as norms are not established for them. %FEV₁ is an indicator of airway obstruction, and is considered one of the most objective and reproducible measures of asthma severity (Enright, Lebowitz, & Cockcroft, 1994; NHLBI, 2007).

Data Analyses

Two separate independent samples t-tests compared asthma functional morbidity and %FEV₁ between Puerto Rican and Afro-Caribbean children. Mann-Whitney U tests examined school absences, doctor visits, and emergency department visits. These tests were chosen as these data were not normally distributed and did not improve with transformation. All analyses were performed with PASW Statistics-Version 17, and a significance level of <.05 was used.

Results

Participants

There were 160 caregiver-child dyads (PR $n=113$, $M_{age}=9.89\pm 2.05$; AC $n=47$, $M_{age}=10.35\pm 2.08$). Significantly more Afro-Caribbean caregivers responded in English, were born outside the continental U.S., and moved to the continental U.S. at older ages compared to Puerto Rican caregivers. Of the Afro-Caribbean caregivers who reported country of origin ($n=39$), the majority was born in Jamaica (54%). Significantly more Afro-Caribbean than Puerto Rican children were born outside the continental U.S. (Table 1).

Asthma morbidity (past year)

Compared to Afro-Caribbean children, Puerto Rican children had statistically greater: functional morbidity (PR: $M=1.85\pm .76$, $n=113$; AC: $M=1.55\pm .78$, $n=47$; $t(158)=2.23$, $p<.05$); school absences (PR: $M=12.56\pm 15.99$, $Md=7$, $n=113$; AC: $M=5.83\pm 6.78$, $Md=3$, $n=47$; $U=1897$, $z=-2.85$, $p<.01$, $r=-0.23$); doctor visits (PR: $M=4.12\pm 6.12$, $Md=3$, $n=113$; AC: $M=3.15\pm 6.14$, $Md=2$, $n=47$; $U=2040.5$, $z=-2.33$, $p<.05$, $r=-0.18$); and emergency department visits (PR: $M=3.76\pm 5.67$, $Md=2$, $n=113$; AC: $M=1.60\pm 1.97$, $Md=1$, $n=47$; $U=1847$, $z=-3.08$, $p<.01$, $r=-0.24$) (Table 2).

Pulmonary function

There was no significant difference in pulmonary function between Puerto Rican ($M\%$ FEV₁=88.46±15.66) and Afro-Caribbean children ($M\%$ FEV₁=89.12±21.53), $t(131)=-$.

199, $p=.84$. Normal pulmonary function is equal to or greater than %FEV₁ of 80 (Barreiro & Perillo, 2004) (Table 2).

Discussion

Puerto Rican children had greater levels of reported asthma morbidity in the past year than Afro-Caribbean children, yet on the objective measure of pulmonary function they did not significantly differ. This disparity between objective pulmonary function and subjective reports may illustrate differences in the approach Puerto Rican and Afro-Caribbean caregivers take in managing asthma. This indicates the importance of interventions targeting the Puerto Rican community, and need for further research focused on Puerto Rican and other Afro-Caribbean children with asthma.

The statistically worse asthma morbidity in Puerto Rican children is consistent with previous research indicating that Puerto Rican children have worse asthma outcomes compared to other Hispanic, ethnic minority, and Caucasian children (Lara, Akinbami, Flores & Morgenstern, 2006). This study indicates that disparities continue to exist when specifically comparing Puerto Rican and Afro-Caribbean children.

As this is a correlational study it is impossible to determine why these differences exist. Contributing factors could include the level of comfort caregivers felt in seeking health care. For instance immigration and legal status can influence if individuals seek health care (Jones, 2005). As an immigrant group Afro-Caribbean individuals face unique challenges, including that their skin color may lead to discrimination, rendering them minorities within a minority group (Deaux et al., 2007; Lopez, 2002). Afro-Caribbean individuals have been described as living on the “margin,” meaning that they interact with the host culture, but at home maintain their own traditions and customs (Archibald, 2011). Those who live on the “margin,” may experience feelings of prejudice, which can affect their interactions with the medical system (Choi, 2001). Yet, many of the participants were recruited from the same asthma clinic, thus they may have had similar access to health care.

Differences could also have been related to interpretation of asthma symptoms and severity. Research by Sidora-Arcoleo and colleagues (2012) found that Puerto Rican parents thought their children’s asthma was more severe than it actually was according to clinical assessments, leading to more acute medical visits for their children. Research has also found that island Puerto Rican children and Latino children (Puerto Rican and Dominican) living in Rhode Island have significantly lower accuracy of asthma symptom perception and higher over-perception (Fritz et al., 2010).

Limitations and Considerations

There are certain limitations and considerations to address. Morbidity measures were collected via self-report, thus could be influenced by recall bias. Additionally, morbidity data was analyzed from the past year, while pulmonary function data were a one-time snapshot. Although standard in research and clinical practice, it is possible that pulmonary reference values could affect the study’s results. It is standard practice to base racial/ethnic pulmonary corrections on self-report, yet this may not be the best means of determining

which reference value to apply (Braun et al., 2013; Quanjer et al., 2012). For those with mixed heritage, the optimal correction value may not be applied, and no specific reference values exist for Puerto Ricans. Another limitation is that adherence to asthma medications was not examined as part of this study. Yet, despite these limitations, this study suggests the importance of further research examining subjective and objective asthma outcomes both within and between Puerto Rican and Afro-Caribbean ethnic groups, in order to better address asthma disparities.

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Table 1

Sample Description

	Puerto Rican % (n = 113)	Afro-Caribbean % (n = 47)	<i>p</i>
Caregivers			
Sex			
Female	98.20 (111)	100.00 (47)	.36
Male	1.80 (2)	0.00 (0)	
Relationship to Child			
Biological Mother	89.40 (101)	93.60 (44)	.40
Other	10.60 (12)	6.40 (3)	
Interview Language			
English	85.00 (96)	100.00 (47)	.005**
Spanish	15.00 (17)	0.00 (0)	
Nativity			
Continental U.S. Born	68.20 (73)	11.40 (5)	< .001***
Caribbean Born	31.80 (34)	88.60 (39)	
Age Moved to U.S. M (SD)	9.32 (9.19)	22.71 (12.27)	< .001***
Years of Education M (SD)	12.22 (2.50)	12.12 (2.80)	.84
SES Poverty Threshold [^]			
Above Threshold	52.69 (49)	43.24 (16)	.33
Below Threshold	47.31 (44)	56.76 (21)	
Children			
Sex			
Female	41.60 (47)	46.80 (22)	.54
Male	58.40 (66)	53.20 (25)	
Age M (SD)	9.89 (2.05)	10.35 (2.08)	.21
Nativity			
Continental U.S. Born	96.19 (101)	79.07 (34)	.001**
Outside Continental U.S.	3.81 (4)	20.93 (9)	
Race			
White	60.2 (68)	0.0 (0)	
Black	15.9 (18)	76.6 (36)	
Multi-racial	9.7 (11)	10.6 (5)	
Other	0.9 (1)	4.2 (2)	
Missing	13.3 (15)	8.5 (4)	

[^] U.S. Department of Health and Human Services, 2008

Table 2

Children's Asthma Outcomes (Past Year)

	Puerto Rican (n = 113) M (SD)	Afro-Caribbean M (n = 47) (SD)	p
Asthma Functional Morbidity	1.85 (.76)	1.55 (.78)	.027*
School Absences	12.56 (15.99)	5.83 (6.78)	.004**
Doctor Visits	4.12 (6.12)	3.15 (6.14)	.020*
Emergency Dept. Visits	3.76 (5.67)	1.60 (1.97)	.002**
%FEV ₁	88.46 (15.63)	89.12 (21.53)	.842