Ethnic differences in asthma-panic disorder comorbidity and the role of primary language spoken

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Scientific Knowledge on the Subject: Panic disorder is over-represented in patients with asthma, and asthma disproportionately affects Puerto Rican and Black/African-American individuals. However, little is known about ethnic differences and the role of primary language spoken in asthma-panic disorder comorbidity. What This Study Adds to the Field: The results suggest that Puerto Rican patients with asthma are at increased risk for panic disorder, and Spanish as primary language may be an additional risk factor.
Abstract

Rationale: There is substantial comorbidity between panic disorder and asthma, which may affect asthma management. Objectives: To compare the prevalence of panic disorder between Puerto Rican and African American asthma patients, and between English and Spanish-speaking Puerto Rican and Dominican patients. Methods: Participants were 306 consecutive patients with asthma (18 – 89 years) recruited from an emergency room and asthma clinic at an inner-city hospital. Patients were assessed for panic disorder with a brief, clinical interview using the Prime-MD Patient Health Questionnaire and follow-up questions to tease apart asthma versus panic attacks. Participants identified their primary ethnicity and reported their frequency of short-acting β2-agonist use during the past week. Measurements and Main Results: Thirty percent of participants reported a panic attack during the last 4 weeks, and 16% met criteria for panic disorder. Puerto Ricans (21%) were more likely to have panic disorder than African-Americans (6.6%; OR = 3.77; 95% CI, 1.40 – 10.17). Spanish-speaking patients had higher rates of panic disorder (40%) than English-speaking Puerto Rican and Dominican patients (15.6%; OR = 3.60; 95% CI, 1.57 – 8.26). Participants with panic disorder (69.4%) were more likely to report daily use of short-acting β2-agonist medication than patients without panic disorder (47.9%; OR = 2.47; 95% CI, 1.15 – 5.29). Conclusions: Results suggest that Puerto Rican patients with asthma are at increased risk for panic disorder, and primarily Spanish speakers may be at even higher risk. It is important to develop culturally appropriate, bilingual interventions for inner-city patients with asthma and panic disorder.

Abstract word count: 248    Key words: African Americans, asthma, Hispanic Americans, mental health, panic disorder
INTRODUCTION

Adults with asthma are at substantially higher risk for panic disorder (PD) than individuals without asthma (1). A 20-year longitudinal, community-based study showed that adults with asthma were 4 1/2 times more likely to develop PD than adults without asthma (1). These data are consistent with other population-based (2) and several clinic-based studies (3-6) showing significant comorbidity between asthma and PD. Conversely, prevalence of asthma among PD patients is also higher than rates of asthma in the general population (1, 7).

There is evidence that asthma and PD may interact with each other and produce greater morbidity for each disease. Asthma and PD share strikingly similar symptoms. Respiratory related symptoms, such as dyspnea, dizziness, chest tightness, feelings of choking and sensations of smothering are common in both disorders. The overlap in symptoms may lead an individual to mistake a panic attack as an asthma attack (8). This confusion may trigger a maladaptive cycle of using short-acting β2-agonists to treat respiratory anxiety symptoms, mistaken as asthma, and thus further increasing feared bodily sensations and panic (9). We have previously shown that a small sample of asthma patients with PD had greater health care use for asthma, and reported lower asthma-related quality of life and greater use of short-acting β2-agonists than asthma patients without PD (10). However, no differences were found on asthma severity. A longitudinal study of comorbid patients showed that PD was associated with subsequent asthma morbidity (1).

Racial/ethnic disparities exist in both PD and asthma when examined as separate disorders. Puerto Rican adults (lifetime prevalence = 6.5%) appear to be at greater risk for developing PD
than foreign-born non-Latino White (3.4%) and Cuban-American individuals (2.4%) (11). This higher rate of PD may be related to the culture-bound syndrome of *ataques de nervios* (nervous attacks), which is an emotional reaction to a stressful event that includes multiple behavioral (e.g., screaming, crying) and physical symptoms, and feeling out of control (12). Report of *ataques de nervios* is common in Puerto Rican and Dominican cultures, and there is some overlap between PD and *ataques de nervios* (13). Non-Latino Black adults (lifetime prevalence = 3.1%) may be at lower risk for PD than non-Latino White (4.9%) and Latino adults (5.4%)(14). Asthma disparities also exist and Puerto Ricans have the highest asthma prevalence rates, followed by non-Latino Black, non-Latino White, and Mexican Americans (15). To our knowledge, no studies have focused on ethnic differences in asthma-PD comorbidity. The study of ethnic differences may help identify patients who are at greater risk for the deleterious effects of asthma-PD comorbidity, and may aid the development of culturally sensitive interventions that are targeted for this population.

The primary aim of the present study was to examine ethnic differences in asthma-PD comorbidity in a primarily Puerto Rican and African-American sample of asthma patients attending an inner-city hospital. We hypothesized that Puerto Rican adults with asthma would have higher rates of PD than African-Americans. We also hypothesized that the rate of PD would be higher in Puerto Rican and Dominican participants who spoke mainly in Spanish than in English. Finally, we hypothesized that asthma patients with PD would report greater use of short-acting β2-agonist medication than asthma patients without PD.

**MATERIALS AND METHODS**
Participants

Consecutive asthma patients were recruited from an asthma clinic and the emergency room (ER) of an inner-city hospital in the Bronx, NY. Due to the very high rates of asthma in the Bronx (16), the ER contains an asthma “booth” where patients with asthma are triaged to a separate area. English-speaking and Spanish-speaking adults 18 years of age or older were eligible for participation. Participants were offered the option of referral to a low cost, psychological clinic, but no financial incentive was offered for participation.

Measures

Clinical psychology graduate students administered the PD section of the Primary Care Evaluation of Mental Disorders (PRIME-MD) Patient Health Questionnaire (PHQ) as part of a psychological interview with participants. The interview was conducted in the clinics immediately following recruitment in either English or Spanish, based on the participant’s preference. The English version of the PHQ had a sensitivity of 81% and a specificity of 99% for diagnosis of PD when compared with structured interviews conducted by mental health professionals (17). Similarly, the Spanish version had a sensitivity of 83% and a specificity of 98% for PD (18). Both versions have good construct validity, as measured by functional impairment, disability days, and healthcare use (17, 18). The PRIME-MD PHQ uses diagnostic algorithms based on DSM-IV criteria. The following criteria are required for diagnosis of PD: 1) an anxiety attack involving sudden fear or panic during the last 4 weeks, and 2) the anxiety attacks have happened before, and 3) some of these attacks come suddenly out of the blue, and 4) the patient is bothered a lot by the attacks or is worried about having another anxiety attack. Furthermore, the patient must endorse at least 4 of the 11 symptoms of panic attacks.
Graduate students were trained using suggested guidelines (9) to ask additional questions to tease apart asthma attacks and anxiety specifically related to asthma versus full PD criteria. Follow-up questions focused on the types of symptoms, onset and duration of symptoms, triggers/situations, and whether panic exclusively occurred in the context of asthma exacerbations. For example, panic attacks can generally be distinguished from asthma attacks by a more rapid onset (i.e., peak of symptoms within 10 minutes), shorter overall duration, and normal peak expiratory flow rate.

A licensed clinical psychologist (JMF) provided supervision for all interviews. One of the interviewers was bilingual and bicultural, and conducted both English and Spanish interviews.

The interview also consisted of demographic questions including age, gender, primary ethnicity, and highest level of education completed. Interviewers also asked how many days participants needed to use their short-acting β2-agonist medication during the past week. Finally, interviewers assessed whether participants were currently receiving psychological or psychiatric treatment for anxiety and whether they were interested in receiving treatment. All participants provided written consent and the study was approved by the local institutional review board.

Data Analysis

Logistic regression models were used to examine between-group differences (Puerto Rican versus African-American, English versus Spanish-speaking) on diagnosis of PD, after controlling for age and gender. Logistic regression was also used to compare patients with PD versus patients without PD on use of short-acting β2-agonist medication during the past week, which was split into daily use versus not daily use. Cohen’s d was calculated as a measure of effect.
size. All analyses were calculated using SPSS software (SPSS Inc., Chicago, IL) and a significance level of \( p < .05 \).

**Results**

*Participant characteristics*

A total of 318 patients with asthma (range: 18-89 years) were approached for study participation and 306 (96.2% completion rate) patients agreed to participate. The most common reasons for refusal were either immediate respiratory distress or refusal to sign consent forms. Participants were primarily Puerto Rican and African-American, and there were more than twice as many female than male participants (Table 1). The psychological interviews were conducted in Spanish for 13.4% of the participants.

*Frequency and Correlates of Panic Disorder*

Thirty percent of participants reported experiencing a panic attack during the past week, and 16.3% \((n = 50)\) met criteria for PD. Patients with PD were older \((51.1 \pm 12.0\) years) than patients without PD \((43.4 \pm 16.2\) years; \( p = .001, d = .49\)). Women (17.4%) were not significantly more likely than men (14.1%) to meet criteria for PD. Educational level was not associated with diagnosis of PD. Recruitment site was not associated with PD, although a trend showed that 20.3% of patients from the asthma clinic had PD versus 13.3% of patients from the ER had PD.

*Ethnic Differences and Panic Disorder*
Puerto Rican patients (21%) with asthma were more likely to have PD than African-American patients (6.6%) with asthma (OR = 3.77; 95% CI, 1.40 – 10.17, p < .01). This finding remained significant after controlling for age and gender (OR = 3.36; 95% CI, 1.23 – 9.19, p < .05). Although the cell size of Dominican (n=20) and Afro-Caribbean (n=20) participants was too small for meaningful statistical comparisons on PD, Figure 1 shows that the rate of PD for these groups closely approximated the rates for Puerto Ricans and African-Americans, respectively.

*Primary Language Spoken and Panic Disorder*

Spanish-speaking (n = 35) Puerto Rican and Dominican patients had even higher rates of PD (40%) than English-speaking (n=128) Puerto Rican and Dominican patients (15.6%; OR = 3.60; 95% CI, 1.57 – 8.26, p < .01). This finding remained significant after controlling for age and gender (OR = 3.19; 95% CI, 1.29 – 7.87, p < .05). The rate of PD diagnosed by the bilingual interviewer (13.5%) on English interviews was not different from the rate of PD diagnosed by the English-only interviewers (13.1%). Thus, this elevated rate of PD in Spanish-speaking asthma patients does not appear to be due to interviewer bias. The rate of PD in Spanish-speaking women was 44.8% (13 of 29); the rate in men was 16.7% (1 of 6).

*Use of short-acting β2-agonist medication*

Asthma patients with PD were more likely to report daily use of short-acting β2-agonist medication (69.4%) versus asthma patients without PD (47.9%; OR = 2.47; 95% CI, 1.15 – 5.29, p < .05). This finding did not change after controlling for age and gender (OR = 2.44; 95% CI, 1.12 – 5.29, p < .05).
Panic Symptoms and Treatment

The three most common panic symptoms endorsed by asthma patients with PD were shortness of breath, heart racing, and sweating (see Figure 2). Two-thirds of patients reported being afraid of dying during panic attacks. Forty percent of participants who met criteria for PD reported receiving psychological or psychiatric treatment for anxiety. Women (50%) were more likely to report receiving treatment for anxiety than men (14%; OR = 6.03; 95% CI, 1.18 – 30.92). Forty percent of patients with PD expressed an interest in receiving psychological or psychiatric treatment for their anxiety.

Discussion:

This study showed that the prevalence of PD was very high in Puerto Rican asthma patients, who were more than three times as likely to be diagnosed with PD than African-Americans. Furthermore, Puerto Rican and Dominican asthma patients whose primary language was Spanish were at even higher risk for PD. Asthma patients with PD were more likely to endorse daily use of short-acting β2-agonist medication than asthma patients without PD. Although numerous studies have shown that asthma patients are at increased risk for PD (1-6), it is important to identify ethnic and cultural factors that may be risk factors for this high rate of comorbidity. To our knowledge, this is the first study to examine ethnic differences and primary language spoken in asthma-PD comorbidity. Given the excessive use of quick-relief medication by PD patients in this sample, these findings have important clinical implications for the management and treatment of asthma.
The higher rate of PD found in Puerto Rican patients with asthma may be related to culturally shaped expressions of emotion, and overlap between the symptoms of asthma, PD, and *ataques de nervios*. Studies of primarily Puerto Rican and Dominican participants have shown that between 17-45% of patients who endorse *ataques de nervios* also meet criteria for PD (13, 19). Furthermore, between 70-72% of these participants reported a lifetime history of having at least one *ataque de nervios* (13, 19). The three most common panic symptoms (shortness of breath, palpitations, sweating) in the present study were also the three most commonly endorsed symptoms by PD patients with *ataques de nervios* (19). Although there is overlap between *ataques de nervios* and PD, *ataques* are more inclusive and can often be distinguished by the occurrence of a major life event as a trigger, longer duration, and a sense of relief that follows the attack (13, 20). The assessment of PD in the present study specifically focused on panic attacks that “come out of the blue”, which addresses a primary characteristic that differentiates PD from *ataques de nervios*.

The very high rate (40%) of PD in Spanish-speaking Puerto Rican and Dominican asthma patients suggests that lower levels of acculturation may be a risk factor for the development of asthma-PD comorbidity. Language barriers with providers may also prevent the detection and treatment of PD in health care settings. Onset of PD typically occurs in the early twenties and the subgroup between 30-44 is most likely to meet criteria for PD (21). The older age (mean = 51.1 years) of PD patients in the present study may be partially attributed to Spanish-speaking participants (mean = 57.4 years), who are more likely to retain and exhibit cultural expressions of anxiety. The common experience of *ataques de nervios* in Puerto Rican and Dominican culture may increase the likelihood that individuals also experience anxiety attacks in response to
the stress of asthma attacks. Asthma may produce threatening bodily sensations and feelings of being out of control, and then lead to the development of chronic anxiety among susceptible individuals. Given that Puerto Ricans have the highest rates of asthma across ethnicities (15), this may be a contributing factor to the high rates of both *ataques de nervios* and PD in this population. *Ataques de nervios* and PD in Puerto Rican adults with asthma may both be connected by excessive anxiety focused on breathing even at times when pulmonary function is normal, although future research is needed to test this hypothesis.

The findings from the present study have several clinical implications for the management of asthma, including potential over-reliance on short-acting β₂-agonist medication by patients with PD. National Heart Lung and Blood Institute guidelines (22) emphasize the goal of limiting use of short-acting β₂-agonist medication to less than 2 days per week, and using a stepwise approach to asthma therapy with emphasis on inhaled corticosteroids to accomplish this goal. Almost 70% of patients with PD in the present study were using their short-acting β₂-agonist medication on a daily basis. However, asthma patients with PD may be over-reliant on quick-relief medication due to confusion between panic and asthma symptoms. PD patients with asthma are more likely to endorse cardio-respiratory panic symptoms than PD patients without asthma (7). Patients with asthma and PD tend to report greater levels of dyspnea during histamine challenge than asthma patients without PD, despite no differences on reductions in lung function (23). Thus, greater perceptual sensitivity and over-interpretation of respiratory sensations may be one mechanism contributing to frequent use of short-acting β₂-agonist medication. Asthma severity classification, controller medication prescriptions, medication adherence rates, and daily measures of pulmonary function would have clarified whether their use of short-acting β₂-agonist
medication was appropriate or excessive. However, rescue medication use is one parameter used to classify asthma severity. It is important for providers to rely on objective measures of pulmonary function given that asthma patients’ anxiety levels are associated with prescriptions for inhaled (24) and oral corticosteroids (25, 26). Similarly, it may also be beneficial for asthma patients with PD to use a peak flow meter to help differentiate between asthma and panic symptoms.

Physiologically based genetic differences may also play a role in the frequency of quick-relief medication use. Puerto Ricans display a lower bronchodilator response to short-acting β2-agonist medication than Mexican-Americans (27). Therefore, Puerto Ricans may be at risk for increased use of short-acting β2-agonist medication and iatrogenic side effects, such as tachycardia and tremor, which can precipitate and exacerbate PD (28, 29). Overuse of β2-agonists can also have detrimental effects on bronchial hyper-responsiveness and the protective efficacy of β2-agonists (30). Poor adherence with inhaled corticosteroids may also contribute to frequent use of rescue medications. Inhaled corticosteroid use is associated with improvements in bronchodilator responsiveness among Puerto Ricans and Mexican-Americans, but not African-Americans (31). Therefore, treatment adherence with controller medications is an especially important area to target for Puerto Rican patients with asthma and PD. Prior studies conducted at the same ER as the present study have shown high prescription rates of inhaled corticosteroids, but low medication adherence rates among asthma patients (32, 33).

There were limitations in the present study and areas that should be considered for future research. No data were collected on measures of asthma severity. Previous research has shown
that asthma severity does not appear to be associated with PD (34, 35), and differences on outcome measures between asthma patients with and without PD appear to be independent of asthma severity (10). The present study involved a convenience sample of treatment-seeking patients, and community-based studies of ethnic differences in asthma-panic comorbidity are needed. Nevertheless, the very high participation rate (96.2%) was a strength of this study, and indicates that these findings may be representative of inner-city asthma patients who use the ER and asthma clinics. It will be important to examine asthma-PD comorbidity among other races and ethnicities. The present data suggest that Dominican asthma patients may also be at elevated risk for PD and Afro-Caribbean patients may have similar levels of PD as African-Americans, but the sample size for these groups was too small to conduct between-group comparisons. The present study also used brief psychiatric interviews to assess PD and did not assess other psychiatric disorders or ataqués de nervios. It will be important to conduct full-length psychiatric interviews to gain a greater understanding of potential mechanisms of racial/ethnic differences in asthma-panic comorbidity.

In conclusion, it is important for medical providers to be aware of the high rates of PD that may exist in Puerto Rican patients with asthma. Spanish as the primary language preference and daily use of quick-relief medication may be additional risk factors for considering PD among asthma patients when they report poor asthma control, but pulmonary function is consistently normal. Health care providers are likely to come into frequent contact with PD patients given their very high rates of health care use and illness-related complaints (36-38). This high rate of health care use has been shown to increase steadily over a 10-year period until a correct diagnosis of PD has been determined. Accurate diagnosis and treatment has been shown to reduce medical
expenditures by 94% (39). Patients who present to the ER with acute hyperventilation are at increased risk for having asthma and panic (40). Most of these patients attribute their attack to a serious disease, but subsequent analyses have frequently shown that there was no organic cause for the hyperventilation (40). The majority of patients with asthma and PD in the present study were not receiving psychological or psychiatric treatment for their anxiety. Therefore, it is critical that providers recognize PD and provide appropriate referrals. A psychological treatment has been specifically developed for comorbid asthma and PD that emphasizes distinctions between asthma and panic symptoms, and combines cognitive behavioral therapy for PD and asthma education (9, 41). A pilot study of this protocol showed that asthma patients with PD reported decreased use of quick-relief medications, fewer asthma and panic symptoms, and improvements in health-related quality of life at post-treatment (41). Multidisciplinary approaches are needed to identify cultural and ethnic factors related to asthma-PD comorbidity, and devise culturally sensitive interventions to reduce asthma and PD morbidity in ethnically, diverse minority populations.
References


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Figure Legends

Figure 1. Rates of panic disorder in Puerto Rican, Dominican, African-American, and Afro-Caribbean participants with asthma.

Figure 2. Percentage of patients who endorsed each panic symptom among asthma patients with panic disorder.
Table 1

Participants’ Characteristics

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* Values are presented as mean ± SD
Figure 1
Figure 2