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Pediatrician qualifications and asthma management behaviors and their association with patient race/ethnicity

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Abstract

Objective—We sought to understand if pediatrician characteristics and asthma assessment and treatment varied in association with the proportion of African-American and Latino children in the pediatrician's practice.

Methods—We conducted a cross-sectional survey of 500 American Academy of Pediatrics members between November 2005 and May 2006. Standardized vignettes were used to test how different indicators of a patient's asthma status affect pediatrician asthma assessments and recommendations. Linear and logistic regression models were used to examine the association of pediatrician assessments and treatment recommendations for these vignettes, respectively, with the proportion of reported African-American and Latino children seen in their practice.

Results—There were 270 respondents (response rate = 54%). Based on pediatrician-reported percentage of minority patients, there were no differences in board certification status, recognition of poorly controlled asthma nor in the likelihood of appropriately increasing long-term controller medications to treat poorly controlled asthma ($p > 0.05$ for all analyses).

Conclusions—Caring primarily for minority children by AAP pediatricians appears unrelated to training qualifications or in their reported knowledge of how to appropriately assess and treat asthma. Therefore, studies of asthma care disparities should focus on understanding the knowledge-base of non-AAP pediatric providers who care for minority populations and exploring other potential contributory provider-level factors (e.g. communication skills).

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Declaration of interest

The authors have no conflicts of interest to disclose or declarations of financial interest to report.

Keywords

Assessment; children; disparities; survey; treatment

Introduction

Racial/ethnic disparities in asthma morbidity, outcomes and care have persisted despite multiple publications of expert panel reports (EPR) from the National Asthma Education Prevention Program (NAEPP) [1–4]. Presumably, if asthma care for racial/ethnic minorities can be improved, then morbidity and outcomes for these groups would be improved, too [5–7]. However, fundamental aspects of care (e.g. use of inhaled steroids, specialist referral for poorly controlled asthma) remain less likely to occur for minority patients than their white counterparts [8,9]. Preliminary evidence suggests that following NAEPP guidelines can improve asthma outcomes for racial/ethnic minorities [5], but the number and scope of published interventions to reduce asthma care disparities is small [10–12] and not physician-focused.

The receipt of care for most racial/ethnic minority patients is segregated into minority-concentrated settings [13,14], such as community health centers. Understanding how pediatricians who work in these settings assess and treat asthma would be important in constructing interventions to address specific causes of disparities in asthma care. Presumably, deficits in asthma assessment and treatment by physicians are readily addressable, and potentially more feasible to implement than some other provider-level or system-level factors (e.g. board-certification status, health care structure). Since significant amounts of resources have been dedicated to physician education (e.g. continuing medical education) as a means of improving asthma care [15–17], it would be valuable to know if there is an asthma “knowledge deficit” among those who care primarily for ethnic minority patients before investing in resources targeted at improving physician knowledge as a means of eliminating disparities.

Before considering the development of interventions to reduce asthma care disparities, there is a need to better understand the role of different elements of care. Most studies of asthma care disparities have focused on the process of care (i.e. receipt of specific elements of guideline-recommended care as reported by parents {e.g. use of inhaled corticosteroids in children with persistent asthma and the provision of written treatment plans to patients}) [18,19]. However, these studies have neither evaluated the physician’s decision-making that underlies the process of providing asthma care (e.g. what factors influence assessments of asthma control or how asthma is treated), nor the extent to which decision-making varies according to patient race/ethnicity.

There has been little examination of the clinical competency of the physician as a cause of asthma care disparities. Tamblyn et al. [20] reported that physicians with higher licensing exam scores were more likely to prescribe inhaled steroids for patients with uncontrolled asthma, but this was not examined in relation to racial/ethnic disparities in care. It was also neither clear how uncontrolled asthma was determined nor was there any insight into how evaluations of asthma control differed between higher and lower scoring physicians.

If physician assessment and treatment behaviors do vary by the proportion of minority patients served, then efforts could be focused on identifying and addressing modifiable factors specific to these physicians (e.g. improving methods of asthma control evaluation, increasing prescribing rates of controller medications). If no such variation is observed, then it suggests some causes of asthma care disparities are independent of the clinical competency of the physician. Therefore, efforts to eliminate disparities would have to consider factors that impact all settings in which minority patients receive care (e.g. poor quality patient–physician communication) [21–23] – factors which may widely prevalent and not be as mutable as changing asthma control assessment practices.

The purpose of this study to determine if physician board certification status (i.e. qualifications) and asthma assessment and treatment behaviors (i.e. clinical competency) varied based on the proportion of minority patients cared for among a national sample of pediatricians.

Methods

Sample

A complete description of the study design has been reported previously [24]. The data for this study were obtained from 500 randomly selected members of the American Academy of Pediatrics (AAP) involved in clinical practice. For the purposes of this analysis, pediatricians were additionally required to report seeing at least one asthma patient weekly. Participants were mailed a self-administered survey accompanied by a letter explaining the study's purpose. A $10 remuneration was provided. The study was approved by the Western Institutional Review Board, Spokane, Washington, USA.

Questionnaire

Pediatrician characteristics—Nine descriptors of pediatrician demographic and practice information were collected based on self-report. First was the percentage of patients cared for by race/ethnicity: Asian/Asian–American, White/Caucasian, Black/African-American, Latino/Hispanic, Native Hawaiian/Pacific Islander, American Indian/Alaska Native and "Other". The sum of responses for each pediatrician was intended to add up to 100%. As the intent of this analysis was to examine care among patient populations known to be at higher risk for poor asthma care and outcomes, we have focused on the proportion of African-American and Latino patients as reported by respondents. Pediatricians also reported on: (2) gender; (3) race/ethnicity; (4) date of medical school graduation; (5) proportion of patients receiving public health insurance; (6) employer [private practice, university medical school, community hospital (with or without a residency training program), Health Maintenance Organization (HMO) or government agency]; (7) practice location (inner city, urban, suburban and rural); (8) weekly volume of asthma patients; (9) board-certification status.

Asthma assessment and treatment behaviors—Since NIH Asthma Guidelines recommend titrating care to differing levels of disease activity, we constructed standardized vignettes to test how each of the following five indicators of asthma status affect pediatrician assessments of asthma control and treatment recommendations:

1. *acute care* (hospitalization for asthma 6 months earlier);
2. *bother*: parent report of being bothered by the child's asthma (as an indication of quality of life impact of asthma);
3. *control*: wheezing and albuterol use reported 4–5 times per week;
4. *direction*: parent reports that asthma is worse at current visit compared to previous visit;
5. *wheeze*: wheezing noted on physical exam.

A vignette without any of these indications was constructed as a reference standard.

For each vignette, respondents were asked to provide an assessment of asthma control, using a visual analogue scale (VAS) consisting of a 100mmline and anchored by the phrases "excellent" at 0mm and "poor" at 100mm to assess asthma control. For each vignette, the pediatrician was asked to place an "x" on the VAS to indicate his/her assessment of asthma control for the vignette. The distance along the VAS from 0mm to the "x" was measured and used as the assessment.

We also sought to assess the effect of each asthma status indicator on the propensity of respondents to step-up treatment from a low-intensity medication regimen. All patients in the vignettes were treated with Fluticasone 44 mcg, were fully adherent to the prescribed medication and had no significant co-morbid conditions or environmental exposures. This vignette protocol used by our research group has been previously reported [24,25].

Analysis

Pediatrician reports of patient ethnic make-up of their medical practice were examined as a continuous variable. Pediatrician characteristics were analyzed using means and proportions. Linear regression was used to examine the independent association of patient ethnic makeup of a pediatrician's practice on his or her assessments of asthma control for each of the asthma status indicators (acute care, bother, control, direction and wheeze) when treated with a low-intensity medication regimen. Beta coefficients represent the mean ratings of asthma control. Logistic regression was used to examine the odds of a pediatrician recommending to increase treatment for a given vignette factor. The linear and logistic regression models were constructed to account for the potential confounding effects from pediatrician race, weekly volume of asthma patients, years in practice, employer (e.g. academic, private practice), setting of practice (e.g. inner city versus suburban) and percentage of patients on public health insurance. Interaction terms were constructed to test the hypothesis of whether the effect of vignette patient factors (acute care, bother, control, direction or wheeze) on pediatrician assessments of asthma control (or on the likelihood of pediatricians to increase treatment) differed by patient ethnic demographics. p Values of <0.05 were considered statistically significant. Analyses were performed using STATA 10.0 (College Station, TX).

Results

Respondent and practice characteristics

A total of 335 pediatricians responded (excluding 4 bad addresses and 13 refusals), representing 69% of potentially eligible respondents. Of these respondents, 270 provided useable data on the ethnic makeup of their patients and reported caring for children with asthma at least weekly; therefore, the analysis was limited to these respondents (Table 1). While data on non-respondents were limited to their mailing addresses, there were no statistically significant differences in respondents and non-respondents by region of the country. Respondents excluded from this analysis had the same distribution for gender, race, years since medical school, percentage of patients on public assistance and percentage of African-American and Latino patients ($p > 0.1$ for all analyses) as those included in this analysis. The groups of included and excluded pediatricians did differ significantly with regard to the location and type of practice: excluded physicians were more likely to be employed by a medical school (19% versus 4.5%), less likely to be in private practice (40% versus 70%), and more likely to work in urban areas (49% versus 36%), with $p < 0.05$ for all analyses.

Pediatricians reported an average patient makeup of 57% Caucasian, 19% African-American, 17% Latino and 11% other racial/ethnic groups. Only physician race/ethnicity was associated with the reported percentage of minority patients. Specifically, 69% of Latino pediatricians and 73% of African-American pediatricians reported that the majority of their patients were from racial/ethnic minority groups, compared to 25% of Caucasian pediatricians ($p = 0.001$). We did not find an association between reported percentage of minority patients and a pediatrician's gender, years in practice or board certification status.

We did find a number of practice characteristics significantly associated with the reported patient ethnic make-up, including practice location, type of employer and proportion of patients on public health insurance. Specifically, 74% of inner-city practices and 43% of urban practices reported a majority of African-American and/or Latino patients, in contrast to 16% of suburban practices ($p < 0.0001$). Approximately 50% of pediatricians in medical schools and 48% of those in community hospitals reported that a majority of their patients were from racial/ethnic minority groups, compared to 25% of pediatricians in private practice ($p < 0.01$).

Effect of patient ethnic makeup on pediatrician assessment of asthma control

Regardless patient ethnic makeup, pediatricians rated asthma control for each asthma status indicator in a similar fashion (Table 2). In general, pediatricians rated patient vignettes with symptoms 4–5 times per week or with a recent hospitalization as having the most poorly controlled asthma, while vignettes with other asthma status indicators were rated as having better levels of asthma control, with no significant differences by proportion of reported African-American and/or Latino patients. Multiple linear regression models did not show any statistically significant association between pediatrician assessments of asthma control and patient ethnic makeup. There was no statistically significant evidence to support an

interaction effect between the percentage of minority patients and each asthma status indicator on asthma control ratings.

Effect of patient ethnic makeup on pediatrician treatment of asthma

Consistent with the patterns we observed for assessments of asthma control, all responses to asthma status indicators with regard to stepping-up patient medications respondents were similar (Table 3). In particular, regardless of percentage of reported African-American and Latino patients, respondents were most likely to recommend increasing medications in the presence of symptoms occurring 4–5 times per week, when wheezing was noted on physical exam, and when the patient had a history of recent hospitalization. Since respondents from all pediatricians recommended increasing treatment when symptoms were present 4–5 times per week, an odds ratio could not be calculated to compare the pediatrician groupings. There was no significant interaction between the effects of physician-reported patient ethnic makeup and vignette-conveyed indicators of asthma status on pediatrician treatment recommendations.

Discussion

This vignette-based study of a national sample of practicing AAP member pediatricians suggests that there is no knowledge-based deficit in assessment and treatment behaviors among pediatricians who care primarily for minority patients. We have demonstrated that these pediatricians are neither less qualified (e.g. years of experience, board certification status), nor do they process and act upon clinical data in a manner different from pediatricians who care primarily for Caucasian patients. These respondents readily recognized indicators of poorly controlled asthma and suggested treatment in a manner consistent with asthma guidelines. This study suggests that inadequate training in the fundamentals of asthma management among AAP pediatricians who are heavily involved in treating minority children with asthma is not an explanatory factor for asthma care disparities.

Our findings are consistent with those recently published by Galbraith et al. [26], who observed that “minority-serving providers” (those with >25% African-American or Latino patients) were equally likely as non-minority serving providers to use inhaled steroids. Galbraith et al observed lower rates of inhaled steroid use for patients seen at community health centers and hospital-based clinics, supporting existing evidence that the site of care is independently associated with disparate health care [27]. We have probed the knowledge-base underlying the evaluation process used by clinicians and arrived at a similar conclusion – that there is neither difference between providers (minority serving versus non-minority serving) in recognizing the need for, nor in the willingness to use inhaled steroids for persistent asthma. With this understanding, future research should focus on developing strategies for clinicians working in these settings to overcome other barriers that preclude the optimal delivery of asthma assessment and treatment processes.

Studies conducted in adult patients with diseases other than asthma have found evidence for physician qualifications as an explainer of health care disparities. Kimball et al. observed poorer quality care of myocardial infarction management among non-board certified

physicians [28]. Gemson et al. [29] found that physicians who served primarily minority patients less often recommended ideal preventive care than their primarily Caucasian-serving counterparts, who were also more likely to be board-certified. Bach et al. [13] noted similar differences in qualifications among minority-serving physicians, but also observed structural barriers for these physicians that could also contribute to health care disparities. There has been little, if any, examination of health care provider qualifications as a mediator of racial disparities in asthma care. Among the group of AAP members who participated in this study, we have observed no significant difference in board certification status, clinical assessment or medication treatment decisions based upon the ethnic/racial makeup of the physician's patient population. It remains to be determined if these findings are consistent among other populations of pediatric health care providers who provide asthma care, including non-AAP pediatricians, non-pediatricians and non-physicians.

There are a variety of clinician- and patient-related factors that may contribute to ethnically disparate asthma care, some of which may be immutable, others of which may be readily changeable. Pediatricians who are treating minority patients may often have to deal with the consequences of poverty and segregation, such as poorer educational attainment, greater social stressors, negative health behaviors, less effective parenting styles and weaker social support systems [30,31]. The consequences of such social phenomena may interfere with the parent's ability to be fully attentive to needs of the child's asthma. If pediatricians are not specifically equipped with strategies for overcoming these types of patient-related barriers, then they may not be sufficiently able to obtain and utilize the critical information needed to assess and treat asthma accurately [32]. Language barriers may contribute further to the challenges of providing health care to these populations [33–35]. There is already evidence that patient–physician interactions are of poorer quality for non-white patients [22,23,36]. Exploration of these interactions and the potential implicit attitudes that may underlie such interactions would require a different and more complicated methodologic approach (e.g. use of videotapes) [37] not part of the design of the original, parent study. While we did not explore these issues, we propose that having a basic knowledge foundation for how to assess and treat asthma is important – without which, an acceptable level of asthma care would be difficult to achieve.

In understanding how asthma care disparities may arise, the location in which the asthma care is provided may be important to consider. Finkelstein et al. [38] observed that ethnic disparities in pre-hospital use of anti-inflammatory asthma medications were eliminated once primary care practice type was accounted for in their multivariable model. Hasnain-Wynia et al. [27] observed significantly poorer quality of care across a variety of disease-specific measures at hospitals where higher percentages of non-white patients were cared for. Bach's examination of the health care providers whom African-American patients seek care in comparison to Caucasian patients suggests that providers for African-American patients have fewer available resources to treat their patients (e.g. access to quality specialists, diagnostic imaging, and ancillary services) [13]. Lieu et al. [32] showed that health care facilities that were more culturally competent also more appropriately prescribed anti-inflammatory asthma medications and received higher parental care ratings. These studies suggest that closer examination of the structural elements of care as a mediator of asthma care disparities is warranted. Interventions, such as cultural competency, low literacy

educational materials, etc., may be the path to tailoring asthma care to high-risk patient populations and may be more readily modifiable factors to intervene upon than poverty or poor social support. We have taken a meaningful step in showing that asthma competency and general qualifications (board certification status) among AAP pediatricians may not be a significant contributing factor to asthma care disparities. However, there are a variety of other mediators of asthma care disparities that remain to be further understood.

We acknowledge several potential limitations to our findings. First, by providing all of the necessary and relevant clinical information, the vignettes we used are not typical of the entire clinical process that occurs in the "real world". We have focused on the physician's ability to process pertinent clinical information, but we are not able to assess their ability to extract this information during a clinical encounter. However, by showing that there is not a deficit in basic asthma management amongst those who treat significant proportions of African-American and/or Latino patients, we have highlighted the need to examine other clinician-related factors that may contribute to ethnic asthma care disparities (e.g. communication abilities). Second, we used race-neutral clinical vignettes, so we cannot rule-out the role that ethnic bias and/or negative interpersonal interactions with African-American and/or Latino patients in the practice of these participants [39–41]. However, the purpose of this study was to understand if there was an "asthma knowledge" deficit among pediatricians caring primarily for African-American and/or Latino children: therefore, the absence of such a disparity should encourage examination of other potential explainers of asthma care disparities. Third, we have used a vignette-based approach to study pediatrician assessment and treatment of asthma, rather than observing actual clinical encounters for African-American and/or Latino patients. The use of clinical vignettes, however, has been shown to be a valid proxy for clinical behaviors of physicians [42], so we feel that this approach has been useful in examining the fundamental ability of these physicians to appropriately recognize and treat patients with poorly controlled asthma. Fourth, we have not specified the different African-American and Latino sub-groups that pediatricians may care for, so we have assumed a similarity in experience across these subgroups. This limitation is common among other studies examining ethnic disparities and will ideally be addressed in future studies. Fifth, as a secondary analysis, we acknowledge that a type II error may also be another explanation of our findings. Finally, we relied upon physician estimates of patient make-up, so the numbers may not be accurate. However, we sought to learn if variability arose based on relative differences in reported patient racial/ethnic make-up. So we believe our findings are still meaningful.

Our findings raise a variety provocative policy questions related to asthma care disparities among children. First, should a knowledge or asthma competency assessment be conducted among non-AAP pediatricians, non-board certified pediatricians or non-pediatricians – all groups that may be more likely than AAP pediatricians to care for the patient populations discussed in this study [19]? Second, should resources be focused on encouraging more pediatric care in private practice settings, where children are more likely to be seen by a board-certified pediatrician, and where the majority of minority children already receive care [43]? Finally, to what extent should future asthma guidelines be focused on providing information on related to minority patients on how to best carry out and meet the standards provided in past guideline versions?

Conclusions

Board certification credentials, reported assessment and treatment of asthma do not vary according to the proportion of minority patients cared for by AAP pediatricians. Interventions designed to reduce disparities in asthma care may not be effective if focused exclusively on improving these providers' fund of asthma knowledge relating to the assessment and treatment of asthma. Future studies should focus on understanding how other provider-level factors mediate disparities in asthma care (e.g. non-AAP members, non-pediatricians, communication skills).

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Table 1

Characteristics of pediatrician respondents[§].

Physician characteristics	Total sample Number of respondents (%)
Gender	
Female	152 (56.5)
Race, *n* (%)	
Hispanic	13 (4.8)
African-American	11 (4.1)
Caucasian	191 (71.0)
Asian	36 (13.4)
Other	11 (4.1)
Missing Race	7 (2.6)
Years since graduation: Mean (SD)	18.2 (9.8)
Number of patients with asthma seen weekly	
10 and below	145 (53.9)
11 and above	118 (43.9)
Area, *n* (%)	
Urban	96 (35.7)
Rural	39 (14.5)
Suburban	128 (47.6)
Other	4 (1.5)
Employer, *n* (%)	
Private practice	188 (69.9)
University Medical School	12 (4.5)
Community Hospital (no residency program)	15 (5.6)
Community Hospital (with residency program)	18 (6.7)
For profit	6 (2.2)
Non profit	14 (5.2)
Government	7 (2.6)
Other	8 (3.0)
Board certified, *n* (%)	178 (66.2)
Percent of patients on public assistance (%)	
51% and above	71 (26.4)
26–50%	48 (17.8)
0–25%	150 (55.8)

[§]Some pediatrician characteristics do not add up to 100% because of missing responses.

HMO, Health Maintenance Organization.

Table 2

Linear regression results to assess whether the rating of asthma control depends on the percent of minority patients in the practice as presented by the interaction terms in each regression model.

	Clinical factor Regression beta coefficient (95% CI)	*p* Value
Bother		
Percent minority patients	0.2 (−1.4, 1.7)	£
Bother (yes versus no)	54.7 (−27, 136.4)	£
Interaction term§	0.3 (−1.5, 2.0)	£
Uncontrolled asthma		
Percent minority patients	0.2 (−1.2, 1.7)	£
Uncontrolled (yes versus no)	591 (511, 672)	<0.0001
Interaction term§	−0.2 (−1.7, 1.4)	£
Wheeze		
Percent minority patients	0.2 (−1.4, 1.8)	£
Wheeze (yes versus no)	107.5 (−4.4, 219.3)	0.06
Interaction term§	−0.8 (−3.0, 1.5)	£
Risk		
Percent minority patients	0.7 (−0.9, 2.3)	£
Risk (yes versus no)	110 (−7, 227)	0.06
Interaction term§	−0.6 (−3.1, 2)	£
Worse		
Percent minority patients	0.2 (−1.4, 1.8)	£
Worse (yes versus no)	−13.4 (−99.3, 72.4)	£
Interaction term§	−0.3 (−1.9, 1.3)	£

Adjusted for pediatrician's race, employer, weekly volume of asthma patients, years since graduation, location and percent of public health insurance patients.

§ *p* Value is for interaction terms to test whether the effect of each asthma status indicator on the likelihood to increase treatment differed by proportion of African-American/Latino patients.

£ *p* Value > 0.1.

Table 3

Logistic regression results to assess whether the decision to increase treatment depends on the percent of minority patients in the practice as presented by the interaction terms in each regression model.

	Clinical factor Odds ratio to increase treatment (95% CI)	***p* Value**
Bother		
Percent minority patients	1.0 (0.99, 1.04)	£
Bother (yes versus no)	7.7 (1.9, 31.0)	0.004
Interaction term§	1.0 (0.98, 1.03)	£
Wheeze		
Percent minority patients	1.0 (0.99, 1.03)	£
Wheeze (yes versus no)	7.6 (2.1, 27.4)	0.002
Interaction term§	1.00 (0.98, 1.01)	£
Risk		
Percent minority patients	1.0 (0.99, 1.04)	0.08
Risk (yes versus no)	5.5 (1.5, 20.1)	0.01
Interaction term§	1.0 (0.96, 1.0)	£
Worse		
Percent minority p	1.0 (0.99, 1.04)	£
Worse (yes versus no)	0.7 (0.2, 3.4)	£
Interaction term§	1.0 (0.97, 1.03)	£

All regression models include physician's race, employer, location, patients seen per week, years since graduation and percent of patients on public assistance.

§ *p* Value is for interaction terms to test whether the effect of each asthma status indicator on the likelihood to increase treatment differed by proportion of African-American/Latino patients.

£ *p* Value >0.1.