



Closing the gap Understanding African American asthma knowledge and beliefs

Jade B. Tam-Williams, MD; Bridgette L. Jones, MD, MS

Children's Mercy Hospital, Kansas City, Missouri



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ABSTRACT

Background: African American children are disproportionately affected by asthma (13% vs 8% non-Hispanic white Americans) and experience 30% higher asthma-related deaths than whites. Knowledge regarding asthma and asthma treatment among African Americans has been postulated as a potential contributor to this observed health disparity. Compared with the amount of studies on asthma, few investigations provide insight into the baseline knowledge and beliefs of African Americans regarding asthma.

Objective: Assess knowledge and beliefs regarding asthma symptoms, diagnosis, treatment, prognosis, and stigmas in a general community sample of African Americans.

Methods: Using community-based participatory research techniques, we developed and implemented a cross-sectional survey to explore asthma knowledge and beliefs among African American adults in a Midwestern city.

Results: Among the 158 African American adults who completed the survey, general asthma knowledge was good, with awareness of the genetic contribution to asthma and general asthma symptomatology (eg, 92% aware of nighttime cough as a symptom). However, asthma-related misconceptions were also revealed. Thirty-three percent of respondents were concerned about addiction to asthma medication, and 60% of respondents believed that inhaled corticosteroids were dangerous or did not know.

Conclusion: This study reveals important insights into asthma knowledge and beliefs among African Americans that may be used to address disparities in asthma outcomes in this population.

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Introduction

Asthma remains a common and serious public health problem affecting 24 million people in the United States. The disease accounts for 1.6 million emergency department visits and 10.5 million physician's office visits each year in the United States.¹ Asthma prevalence rates are higher among specific populations such as children, females, ethnic minorities, and those living below the poverty level; many of these groups also have higher rates of asthma-related morbidity and mortality.² African Americans with asthma experience disproportionate rates of morbidity and mortality compared with whites.³ African American patients with asthma are hospitalized at twice the rate of whites (29.9 per 10,000 in African Americans compared with 8.7 per 10,000 in whites).⁴ Death rates among African Americans attributable to asthma are 23.9 per million, in comparison with 8.4 per million in whites.⁵ For children, number of missed school days is an indication of morbidity and impact on family life. Recent data indicate a higher prevalence of minority children missing school because of asthma: 60% to

70% among African American children in comparison with 40% to 50% among white children.⁶ Although asthma knowledge and the ability to manage the disease have been described as factors influencing this observed health disparity, surprisingly few studies have investigated the knowledge and beliefs of African Americans about asthma and asthma treatment. Cultural differences in beliefs and knowledge have been shown to affect patient management of diseases.^{7–9} Therefore, the impact of cultural differences on the choices families make with regard to asthma self-management, therapeutic interventions, environment, and health care use are important to consider in addressing gaps in health outcomes.

Community-based studies regarding asthma knowledge are limited, and fewer studies target African American populations. Deis et al¹⁰ conducted a survey among parents/caregivers (n = 229) of patients with asthma who presented to 2 different pediatric emergency departments to assess medical knowledge regarding medications, asthma action plans, and spacer devices. They identified differences in what parents understood about the purpose of inhaled corticosteroids (29% responded it would open airways immediately; 24% responded they did not know) as well as lack of daily inhaled corticosteroid use in children with persistent asthma. They also identified a desire for asthma education. Forty-four percent of their study population was African American, 34% white, and 16% Hispanic. Of interest, they found that non-African Americans were more likely to receive a written action plan and have a scheduled preventive asthma

Reprints: Jade B. Tam-Williams, MD, Children's Mercy Hospital—Kansas City, Division of Pulmonary & Sleep Medicine, 2401 Gilham Road, Kansas City, MO 63108 E-mail: jbtamwilliams@cmh.edu.

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care visit.¹⁰ In a community-based study, Brown et al.¹¹ interviewed 221 African American and Afro-Caribbean women in 10 Brooklyn area beauty salons regarding a number of common disease processes (asthma, heart health, breast health, prostate health, secondhand smoke, and sexual health). This study found that participants had a good knowledge base regarding factors and symptoms of common diseases; however, the study was limited in gauging the broad knowledge of asthma, because it only assessed knowledge regarding secondhand smoking and asthma.¹¹ In another community-based study conducted by Malone et al.,¹² they aimed to characterize asthma knowledge in “high-risk neighborhoods.” There was lower asthma knowledge overall in high-risk neighborhoods compared with the general Chicago community sample. Notably, within the high-risk neighborhoods, 85% of individuals surveyed were African American.¹² This study is not representative of asthma knowledge in the general African American population, because the African American population comprises those with varied financial and social backgrounds. Therefore, understanding asthma knowledge among a well-represented population of African Americans is important for tackling current asthma-related health disparities in this group.

The aim of this study was to understand the knowledge and beliefs among the general population of African American adults in a metropolitan area using community-based research techniques.

Methods

We conducted a cross-sectional study among African American adults in the Kansas City, Missouri metropolitan area (local census data from 2016 reported a total population of 459,787 and 29.9% African American), using a survey questionnaire to explore the attitudes, beliefs, and knowledge about asthma common among this group. Survey development used a community-based participatory research approach, which was previously described in detail.¹³ The questionnaire was developed by a community action board (CAB) comprising members of a local predominantly African American church, members of a nonprofit health organization, community members who either have asthma or have a child with asthma, and academic researchers. The CAB worked collaboratively to (1) determine potential barriers and content areas in the survey; (2) develop culturally appropriate, relevant, clear, and concise questions related to the topics; (3) determine best methods for administration of the survey (electronic vs paper format); and (4) identify appropriate venues for data collection. Themes and questions for inclusion in the survey were considered by the CAB members in light of whether they believed that they addressed misconceptions and beliefs regarding asthma, gaps in asthma knowledge, and attitudes regarding asthma that were relevant in the local African American community and the African American community at large. The CAB considered a variety of themes, and questions based on previous literature as well as new themes or questions were identified.^{12,14,15} The CAB developed a 37-item survey, “Asthma Related Attitudes, Knowledge and Beliefs,” to be conducted in the community. Survey questions used Likert-type response options of “strongly agree,” “agree,” “do not know/not sure,” “disagree,” and “strongly disagree.” The survey was conducted among a random convenience sample of adult self-identified African American participants during community events within the Kansas City metropolitan area. The study was approved by the Children’s Mercy Hospital Institutional Review Board and was conducted in accordance with ethical standards. Per the Children’s Mercy Hospital institutional review board, no consent was required for participation in the study because no identifying data were collected. The survey was conducted concurrently with another separate survey designed to explore research knowledge and barriers to African American research participation.¹³

Statistical Analysis

For data analysis, the Likert scale responses for “strongly agree” and “agree” were collapsed into 1 single category of “agree”; responses of “disagree” and “strongly disagree” collapsed into the “disagree” category. Descriptive data were summarized as frequencies for all survey responses.

Results

The total number of participants surveyed was 169, with a 95% response rate. Among those who declined to participate, the most common reason reported for unwillingness to participate was lack of time. Among the 169 participants who completed the survey, 11 did not self-identify as African American. Data for these respondents were excluded from this analysis. Demographic information is presented in Table 1 and indicate a range in age, education, and economic status among respondents.

Experience with asthma was highly prevalent among the participants. Thirty-eight percent reported a personal diagnosis of asthma, 78% reported they have a family member with asthma, and 59% reported that they have cared for someone with asthma (Table 1). Most survey respondents indicated general knowledge of asthma pathophysiology, presentation, and triggers (Table 2). Most survey respondents agreed that asthma was genetic (72%) and was not contagious (84%). A little over half agreed that there was an

Table 1
Demographics of Study Participants

	Number (%) of study participants
Total number	169
Race	African American: 158 (93.4%) Non-African American: 11 (6.6%)
Ethnicity	Hispanic: 2 (1.1%) Non-Hispanic: 155 (91.7%) Did not report: 12 (7.1%)
Age groups (years old)	18–25: 12 (7.2%) 26–35: 76 (45.5%) 36–45: 33 (19.8%) 46–60: 42 (25.2%) 60–75: 4 (2.4%) Total < 40: 121 (72.5%) Total > 40: 46 (27.5%)
Highest level of education ^a	Grade school: 9 (5%) High school or GED: 61 (36%) Post-high school education or technical education: 7 (4%) College and above: 91 (54%) Some college: 45 (26%) Associate’s degree or technical school certificate: 27 (16%) Bachelor’s degree (BA, BS): 10 (6%) Some graduate school or graduate degree: 9 (7%)
Insurance ^{a,b}	Medicare: 29 (17%) Medicaid: 51 (30.2%) Private or some private: 59 (35%) No insurance: 37 (22%)
Experience with asthma	Personal diagnosis of asthma: 64 (38.3%), 2 did not report Family member with asthma: 124 (78%), 10 did not report Cared for someone with asthma: 98 (59.8%), 5 did not report

^aN = 1 did not report.

^bRespondents were able to mark all that apply.

Table 2
Asthma Knowledge and Beliefs by Explored Themes

Survey items (N = number of respondents with missing data for question)	Strongly agree or agree, n (%)	Do not know or not sure, n (%)	Disagree or strongly disagree, n (%)
<i>Asthma pathophysiology</i>			
Asthma runs in families (n = 1)	121 (72.0)	20 (11.9)	27 (16.1)
Cigarette smoke causes a person to develop asthma (n = 13)	102 (65.4)	27 (17.3)	27 (17.3)
Having allergies and/or skin rashes (eczema) can make a child more likely to develop asthma (n = 9)	92 (57.5)	41 (25.6)	27 (16.9)
You can catch asthma from someone else that has asthma (n = 7)	11 (6.8)	14 (8.6)	137 (84.6)
<i>Asthma manifestations</i>			
Wheezing is a major symptom of asthma (n = 1)	155 (92.3)	8 (4.8)	5 (3)
People with asthma always have difficulty breathing (n = 2)	116 (69.5)	16 (9.6)	35 (21)
People with asthma usually cough more at night time (n = 4)	122 (73.9)	30 (18.2)	13 (7.9)
If a person only coughs, then they probably do not have asthma (n = 7)	46 (28.4)	50 (30.9)	66 (40.7)
Asthma causes chest pain (n = 5)	136 (82.9)	22 (13.4)	6 (3.7)
<i>Asthma diagnosis</i>			
Asthma can be diagnosed in very young children (<4 years old) (n = 2)	146 (87.4)	12 (7.2)	9 (5.4)
Asthma can only be diagnosed by a breathing test (n = 4)	71 (43)	45 (27.3)	49 (29.7)
Asthma can be diagnosed with a blood test (n = 50)	16 (13.4)	67 (56.3)	36 (30.3)
<i>Asthma treatments</i>			
People can become addicted to asthma medications (n = 6)	55 (33.7)	66 (40.5)	42 (25.8)
Over-the-counter cough medications are good treatments for asthma (n = 27)	21 (14.8)	54 (38)	67 (47.2)
Inhaled steroids that are used to treat asthma are dangerous (n = 23)	38 (26)	56 (38.4)	52 (35.6)
If a person does not have asthma symptoms every day, they should stop taking their daily asthma medications (n = 8)	33 (20.5)	38 (23.6)	90 (55.9)
<i>Asthma triggers</i>			
Colds (viruses) are a major trigger for asthma (n = 6)	120 (73.6)	26 (15.9)	17 (10.4)
Weather that is very hot or cold can trigger an asthma attack (n = 5)	149 (90.9)	13 (7.9)	2 (1.2)
Allergies can trigger an asthma attack (n = 6)	146 (89.6)	14 (8.6)	3 (1.8)
Having cockroaches or mice in the home can cause an asthma attack (n = 6)	109 (66.9)	41 (25.2)	13 (7.9)
<i>Asthma perceptions</i>			
Children usually outgrow asthma when they get older (n = 2)	87 (52.1)	49 (29.3)	31 (18.6)
Taking asthma medications every day will cure asthma (n = 4)	34 (20.6)	44 (26.7)	87 (52.7)
If a person stops having asthma attacks, then they probably no longer have asthma (n = 3)	33 (19.9)	41 (24.7)	92 (55.4)
If a person has asthma, they should not play sports or exercise (n = 4)	24 (14.6)	28 (16.9)	113 (68.5)
<i>Asthma stigma</i>			
People who have asthma are likely to die at a young age (<30 years old) (n = 3)	21 (12.7)	39 (23.5)	106 (63.9)
If my child had asthma, other kids would tease him or her (n = 2)	29 (17.4)	39 (23.3)	99 (59.3)
Only sickly people get asthma (n = 4)	16 (9.7)	24 (14.6)	125 (75.8)

atopic contribution to asthma (57%). Sixty-five percent of respondents agreed that smoking contributed to the development of asthma. Most correctly identified asthma manifestations and symptoms: wheezing (92% agreed), nocturnal cough (74%), difficulty breathing (69%), and chest pain (82%). Results regarding cough as potentially the single manifestation of asthma were scattered, with 30% reporting not knowing or unsure, 28% agreeing, and 40% disagreeing. Most survey respondents also identified common triggers of asthma: viruses (73%), weather (90%), allergies (89%), and environmental triggers (66%).

Knowledge regarding diagnosis and treatments demonstrated more variability in response. A predominant number of respondents believed

that asthma could be diagnosed in those under the age of 4 years, but responses were varied with regard to whether asthma could be diagnosed with a breathing test or a blood test. Forty-three percent of respondents agreed that asthma could be diagnosed via a breathing test, but the question regarding whether a blood test could be used to diagnosis asthma was not answered by 50 individuals. Whether this question was overlooked because of its location at the top of the survey form or left intentionally blank by respondents was unclear. Of the 119 who responded to the question, more than half were unsure whether asthma could be diagnosed by blood test. With regard to treatment of asthma, 33% of respondents thought that one could become addicted to their asthma medications, but most were unsure (40%). Beliefs regarding

whether inhaled steroids were dangerous were assessed. Twenty-three individuals did not answer the question, and of the remaining 146 responses, 64% either did not know or believed that inhaled corticosteroids were dangerous. Beliefs regarding whether over-the-counter medications were as effective as prescription medications for asthma treatment also varied. Most respondents disagreed that over-the-counter medications were as “good” as prescription medications (47% of respondents), but 38% of the responses were unsure, and 27 did not answer the question. Most respondents disagreed that medications should be discontinued once symptoms resolved (56%), but up to 20% agreed that it should be discontinued and 23% were unsure. Approximately half of respondents disagreed that taking medications every day would cure asthma (52%), and 55% of responses disagreed that when asthma attacks stop the individual no longer had asthma.

The manner in which asthma is stigmatized was also part of our assessment. Specifically, beliefs with regard to whether asthma led to premature death, whether those with asthma would be teased, or whether asthma only occurred in the “sickly” were included. Sixty-eight percent of individuals disagreed with the statement that individuals with asthma should not exercise or play sports. Most disagreed with the statement that individuals with asthma die at an early age (63%), and most respondents thought that children could outgrow asthma (87%). Fifty-nine percent disagreed that their children would be teased if they had asthma, and 75% disagreed with the statement that only sickly people got asthma.

Forty-five percent of all participants believed asthma was a problem in their community. Only 9.5% stated that asthma is not a problem in their community. In response to the statement “Most people know enough about asthma,” 56% disagreed, indicating an awareness of lack of knowledge in the general community. Among those who indicated a need for community asthma education, community events and churches were identified as desired venues for asthma education.

Respondents also were given an opportunity to provide free text responses describing their personal experiences with asthma. Free text responses included descriptions of the respondent's or a child's asthma symptoms: “bad chest pains”; “hard breathing”; “at night my son coughs more.” One responder wrote, “had my first asthma attack as an adult. It was triggered by a severe allergy attack.” Respondents also described their thoughts on asthma prognosis: “all my life”; “My son outgrew it!”; “childhood asthma and flair ups when pregnant”; “cousin died at 12 from asthma.” One respondent demonstrated interest in other possible treatments: “How can I cure it at home?” A few respondents remarked on asthma's effect on their life: “It has been very scary!”; “It's very hard.” These responses highlight the real-life and day-to-day impact of the disease on patients and families.

Discussion

Considering the vast amount of research on asthma, few studies describe the knowledge and beliefs of minority populations regarding asthma, although these groups are disproportionately affected by the disease. More broadly, African American and other minority populations are underrepresented in clinical and translational research studies.^{13,16,17} Lack of well-designed studies adequately representing populations highly affected by disease are a significant barrier to improving health outcomes in these groups. In comparison with previous studies that have included selected groups of African American participants, our study provides insight into asthma knowledge specific to African American adults but included participants of various educational and financial backgrounds as well as experience with asthma. Therefore, these study findings may be applied more broadly to the general African American population.

We observed that respondents' general asthma knowledge about the role of genetics and atopy in asthma risk and symptomatology was good. Variable knowledge of asthma diagnosis and management

were identified as addressable knowledge gaps. One third of survey respondents were concerned that a patient could become addicted to inhaled corticosteroids, and most indicated that they did not know whether this was possible. More than half of the respondents were concerned that inhaled corticosteroids were dangerous. In addition, nearly half of participants either agreed or were not sure whether an individual should stop taking medications if they stopped having asthma symptoms. Considering the fact that effective asthma management relies on daily controller therapies that may eliminate persistent daily symptoms, these findings are important to address within educational programs and to identify an addressable barrier to medication compliance among African American patients. Previously, lack of asthma knowledge has been associated with poor adherence to inhaled corticosteroids. Mosnaim et al¹⁸ showed that inhaled corticosteroid knowledge was associated with medication adherence among African American or Hispanic adolescents with persistent asthma. Misperceptions about asthma medication also has been shown to affect asthma outcomes. Negative perceptions of asthma medications among Hispanic and African American parents was associated with increased asthma symptoms in their child with asthma.¹⁹ Our study reveals important considerations among African American adults for effective asthma treatment counseling.

Stigmas regarding asthma were also assessed as a possible limitation to asthma care, because this may affect acceptance of diagnosis and treatment of racial/ethnic minority populations. Our study revealed little stigma associated with asthma diagnosis among our respondents. Most respondents indicated that those with asthma should be able to participate in activities such as exercise and sports and that they have a general prognosis and quality of health similar to that of the general population. However, we note that 17.4% of respondents thought that other children would tease a child who had asthma. Acceptance of asthma diagnosis and treatment, especially treatments that may require administration among peers (eg, albuterol before exercise) may need to be considered further when counseling parents and caregivers about asthma in their child.

Although more than half of survey respondents did not indicate that asthma was a problem for their community, an almost equal number believed that asthma education was needed in the community and wanted to learn more about asthma at church and community events. Previous studies have demonstrated the benefits of community-based asthma education. Multidisciplinary educational programs have demonstrated improvement in asthma knowledge, asthma severity, and healthcare utilization (eg, decreased emergency room physician office visits for asthma).²⁰ Community asthma education by non-medical educators also has been described to improve asthma knowledge up to 1 year later, with associated improvements in asthma control and quality of life scores.²¹ However, another study conducted monthly visits with an asthma nurse practitioner to provide intensive education and demonstrated that asthma education programs improved overall education but did not correlate with improved health outcomes.²² A limitation of asthma education programs is that education has not always been tailored to the needs of specific racial/ethnic or cultural groups. In addition, education may not lead to execution of a home plan if inherent biases regarding asthma medications are present. Tailoring asthma education to the specific needs of the community may improve retention of the information, compliance to medications, and health outcomes.

We did not observe differences in asthma knowledge in relation to demographic characteristics such as financial or educational background. However, our sample size was limited. Asthma knowledge and beliefs may differ among those from different educational or financial backgrounds and should be explored within the African American population. Our study population included a relatively smaller group of African American participants with advanced educational backgrounds (eg, college degree or more) and disproportionately included those who are socioeconomically disadvantaged. Because of this disproportionate makeup, we were unlikely to

identify significant differences in response between socioeconomic or educational groups within African Americans.

In addition, because our study was focused on knowledge and beliefs among African Americans and only aimed to enroll this population, we were not able to compare their responses with those of other racial/ethnic groups. This would have allowed us to identify differences that may be important in designing educational interventions specific to particular populations. Furthermore, our study did not explore differences in asthma knowledge and beliefs in other racial or ethnic groups that are highly affected by asthma. Even less information is available regarding asthma perception and knowledge in minority groups such as Asian Americans, Arab Americans, Native Americans, and Latino populations.^{23–26} To our knowledge, only 1 study has been published regarding Asian-American perception and knowledge of asthma in the United States²⁷ and 1 large multinational study from Asian-Pacific countries and Hong Kong.²⁴ Lee et al²⁷ found that Asian-American participants had less knowledge regarding asthma than white Americans, African Americans, and Hispanics combined.²⁷ Hammad et al²⁸ surveyed 600 Arab Americans from 160 households in the Detroit area and showed that families with higher asthma knowledge scores were more likely to have personal experience with asthma and higher education levels. Using this baseline survey, they tailored household interventions and showed improvement in level of asthma knowledge overall.²⁸ Van Sickle and Wright²⁵ reported on Navajo perceptions by surveying 22 Navajo families and found that perceptions regarding asthma medications would influence how and when medications were taken as well as health care utilization.²⁵ Cultural beliefs regarding asthma also have been explored in Latino parents of children with asthma; Koinis-Mitchell et al²⁶ conducted a cross-sectional study in Latino families comparing those living in Rhode Island and those living in Puerto Rico and found similar beliefs but different practices for asthma treatment. Their study also explored variation in cultural beliefs between Latino families in the United States and those in Puerto Rico regarding complementary and alternative medical therapies (eg, herbal remedies, mind–body practices) and conventional treatments.²⁶ Likewise, among African American populations, cultural beliefs may also affect knowledge about asthma (eg, herbal treatments work better for asthma than conventional medicine); because our survey was informed by community members, some of these may not have not been explored in this study.

Overall, these investigations further support our premise that knowledge and beliefs regarding asthma are variable across different racial and ethnic groups in America and culture, which may impact how often asthma medications are taken, use of complementary and alternative medications, estimation of level of control, as well as the use of health care services. These studies along with our findings highlight a significant need for better understanding of the differences in asthma knowledge and beliefs among underrepresented groups.

Future research should be conducted to explore the impact of educational interventions that are specific to the educational and knowledge barriers identified among African American communities and taking into account variation by educational background and financial status. Such interventions will likely be more effective in improving asthma outcomes and closing the health care disparity gaps in this group. Future studies should also be conducted among other underresearched racial/ethnic groups (eg, Hispanic, Asian, Native American) to provide culturally informed education and care to these patients and importantly to improve health outcomes in these populations.

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