



A home visit program for low-income African American children with asthma: Caregivers' perception of asthma triggers and a gap in action

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ABSTRACT

Purpose: The goals are to gauge caregivers' knowledge of at-home asthma triggers and identify the areas on which educational campaigns can focus to alleviate a child's asthma symptoms.

Design and methods: Families with children with moderate to severe asthmatic symptoms who had been recently hospitalized or in the emergency room were invited to participate in a home visit program. As part of the home visit, caregivers of the asthmatic children were asked a series of questions on asthma triggers and the measures for eliminating the triggers ($N = 218$).

Results: Findings show a gap between caregivers' perception of asthma triggers and the actions to mitigate or avoid such triggers.

Conclusions: Overall findings show that home environments were suboptimal for the management and control of child asthma conditions. Knowledge about home triggers as well as the actions and efforts by caregivers and landlords to mitigate these was found to be inadequate. Even when caregivers are aware of the presence of at-home triggers, actions to minimize exposure to the trigger do not always follow due to a lack of power, resource, and knowledge.

Practice implications: The findings raise the need for additional research to investigate the reasons for the lack of actions, advocacy for low-income families to live in a healthy environment, continued education and empowerment, and patient/caregiver-doctor partnership. Additionally, the provision of community support through community advocacy and training of culturally competent healthcare providers are needed for the successful management of pediatric asthma among African American children.

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Asthma is the most common chronic lung disease among children, affecting approximately 7% of children in the United States (Ferrante & La Grutta, 2018). Asthma cannot be cured but can be controlled by reducing exposure to asthma triggers (Zahran et al., 2018). Children with asthma can benefit from a reduction of exacerbating triggers at home, potentially leading to a decrease in the number of hospital stays and emergency visits (Bracken et al., 2009). For effective management of child asthma, it is critical for caregivers to have pertinent knowledge of environmental and at-home triggers that make their children's asthma worse (Camargos et al., 2012; Peterson-Sweeney et al., 2003). Such knowledge or awareness needs to be followed by actions to minimize exposure to potential triggers.

A home visit program provides an opportunity to assess the presence of home-based triggers and provide comprehensive care, augmenting clinic-based care (Anderson et al., 2020; Campbell et al., 2015). Our study reports findings from a home visit program called Breathe Easy Project, led by Breathe DC, a non-profit organization in the District of Columbia (DC). The Breathe Easy Project is a home visiting program for moderate to severe, persistent asthmatic children who have been recently hospitalized or in the emergency rooms.

By surveying caregivers of children with asthma as part of the home visit program, our study aimed to (a) understand caregivers' perceptions regarding the presence of at-home asthma triggers and (b) identify the areas on which future educational campaigns can focus to alleviate child's asthma symptoms. Our study, in particular, focused on African American inner-city children, who are disproportionately affected by asthma. Non-Hispanic African American children are

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five times more likely to be admitted to the hospital and eight times more likely to die from asthma than non-Hispanic Caucasians (Office of Minority Health, 2021). Asthma is also more prevalent in urban compared to rural areas (Keet et al., 2015).

Methods

Participants

Children with moderate to severe, persistent asthmatic symptoms who had been recently hospitalized or in the emergency room were either referred by Managed Care Organizations (MCOs) or self-referred by families to participate in a home visit program. Families eligible to participate in the home visit program were those residing in the District of Columbia and having children (21 years old and younger) who have recurring asthma episodes due to at-home triggers. As part of the home visit, children's caregivers were asked a series of questions on asthma triggers and the measures for eliminating the triggers. The questionnaire was conducted by Breathe DC asthma educators as part of Breathe Easy Project project. Breathe DC staffs are African Americans and other racial minorities who often share the demographic backgrounds of the households they serve. DC is subdivided into eight smaller governmental units called wards. Breathe DC is located in Ward 8 and serves families mostly in Wards 7 and 8, where over 90% of the residents are African Americans. Breathe Easy program was offered to families with asthmatic children at no charge and recommended by trusted case managers and healthcare providers, increasing its acceptability among its participants. The Breathe EASY program was provided to families with asthmatic children who had medical coverage through DC managed care organizations.

Procedure

The questionnaire was orally asked from 2018 to 2020 to caregivers of 226 children who participated in the home visit program. The responses were recorded by staff who led the home visit program. The questionnaire included 18 questions about caregivers' perception of asthma triggers, the presence of at-home asthma triggers such as bugs, rodents, water leaks, and smokers, and the actions taken to mitigate the child's asthmatic symptoms. These questions were developed based on the review of prior literature (Breyse et al., 2004; Chew et al., 2003; Krieger et al., 2010; Phipatanakul et al., 2000; Pongracic et al., 2008; Salo et al., 2008) with consultation with pediatric asthma experts. It took about ten to fifteen minutes to complete the questionnaire.

Based on the response to the questionnaire, caregivers received a targeted educational intervention to assist with reducing triggers in the home environment that can aggravate asthma attacks in young children. If needed, families received referrals to pest management services, pillowcases and mattress covers, dust mite covers, HEPA vacuums, and smoking cessation counseling. The current paper reports the findings from the questionnaire.

Analysis

The data were cleaned and analyzed using SPSS 26. Descriptive statistics, including frequency and crosstab analyses, were used.

Participant characteristics

Participants' racial and ethnic makeup consisted primarily of African American families (98%). Although income was not captured in the data, all participants were from low-income families receiving Medicaid or MCO services. For example, a 4-person family receiving Medicaid or MCO service in Washington DC makes less than \$36,000 per year or meets other non-financial eligibility criteria (e.g., blind or with a

disability). The majority of the participants (95%) were renters compared to homeowners (5%). More specifically, 73% of the participants reported living in a DC public housing complex or Section 8/voucher housing, with only 5% living in their own housing. In terms of housing type, 7 out of 10 reported living in multi-dwelling homes (e.g., apartments) and 3 out of 10 in single-family homes. About three-quarters of the children in our sample were living with a single parent (74%) and with one or more siblings (72%). About half of the sample reported living in the current building or house for over two years (49%), with 20% living in the current residence for less than six months.

Results

When caregivers were asked about what made the child's asthma worse, the most frequently mentioned triggers were weather (86%), dust (85%), and exercise (67%). Roaches (43%), tobacco smoke (48%), and mold (35%) were selected by less than half of the respondents as potential triggers that worsen their child's asthma (Fig. 1).

Regarding the presence of mice, roaches, rats, or bedbugs in or around their home, about three-quarters ($N = 162$, 74%) of respondents said they had seen them. About half, or an average of 50% of respondents, mentioned bugs and rodents, respectively as triggers of the child's asthma.

With regards to the change of furnace filters at home (Fig. 2), caregivers were asked, "When was the last time the furnace filters were changed?" Approximately one-third (35%) did not know the answer to the question, and roughly a quarter (27%) answered never. About a quarter (27%) answered that furnace filters were changed 6 months ago. Additionally, 6% and 5% of the respondents answered one year ago and more than one year ago, respectively. Even though 85% of respondents chose dust as a child asthma trigger, 7 out of 10 (73%) have never had their furnace filters changed, did not know the answer, or changed their filter a year or more ago.

Caregivers were also asked about experiencing water leaks and their location (Fig. 3). About four out of ten (37%) reported having an incidence or incidences of water leaks, mostly in bathrooms. When the responses were compared against those who chose mold as an asthma trigger, about a third (34%) of those who had a water leak mentioned mold as an asthma trigger and the remaining two-thirds (66%) did not (Fig. 4).

The caregivers were also asked about the presence of smokers at home. Those who have smokers in their household (97%) were much more likely to mention tobacco smoke as an asthma trigger. However, only 22% of those with people in the household smoking cigarettes said they were interested in quitting smoking.

Discussion

The current study shows that reducing triggers at home needs to start from knowledge and then must be followed by the implementation of actions that help minimize the exposure to such triggers. Given the characteristics of our sample (low-income renters), the actions need to be taken not only by caregivers but also by landlords who manage and maintain the rented properties, as well as by local, state, and federal public housing authorities who design and implement healthy home initiatives to promote safe and sanitary housing as a means for preventing disease.

Our paper shows a gap between caregivers' perception of asthma triggers and the actions to mitigate or avoid such triggers. For example, although dust was the most frequently mentioned trigger by caregivers, the study found that most did not know or remember the last time their filter was changed. Similarly, only about one-fifth of smokers at home were interested in quitting even when most of them are aware of tobacco smoke as a trigger that worsens their child's asthma. Additionally, although indoor asthma triggers are critical in controlling

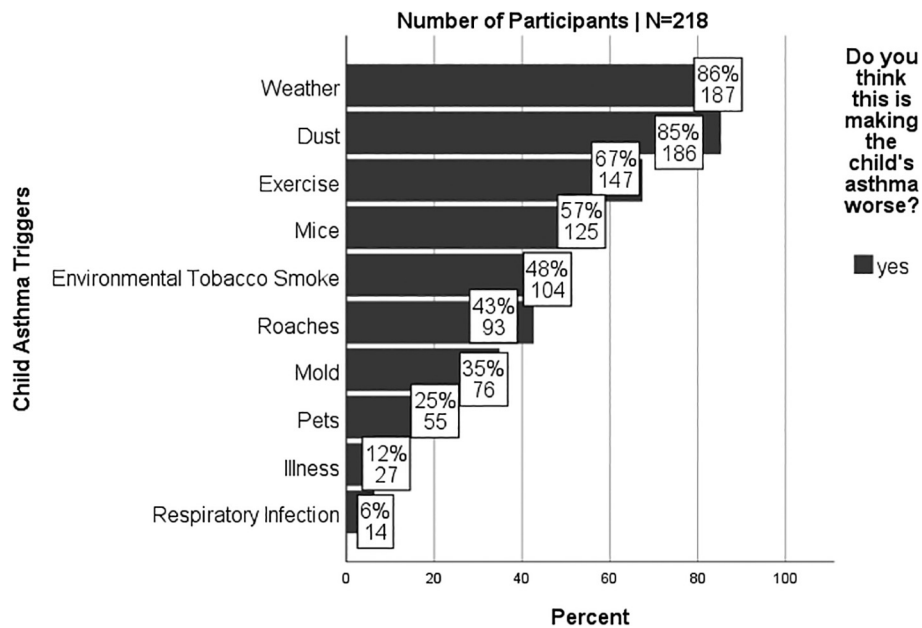


Fig. 1. Bar graph of triggers participants report as making the child's Asthma worse ($N = 218$).

asthmatic symptoms, many failed to identify many of those, such as roaches, molds, and pets and have the adequate resources or power to take action (e.g., requesting pest management to landlords).

Overall findings show that home environments were suboptimal for the management and control of child asthma conditions (Sagani & McKenzie, 2002). Knowledge about at-home triggers as well as the actions and efforts by caregivers and landlords to mitigate these was inadequate. Our research raises the need to empower caregivers and educate landlords to provide healthy at-home environments for asthmatic children. Consistent with previous studies (e.g., Bellin et al., 2017; Crowder et al., 2015), findings suggest that more education for both caregivers and property owners on the effect of environmental and indoor triggers on asthma is critical. Even when their household had pest and water leak issues, many were not able to receive support from landlords or failed to take further actions to control them. Even when caregivers were aware of a potential link between dust and

asthma, actions to minimize exposure to the trigger did not always follow. This raises the need for additional research to investigate the reasons for the lack of actions (e.g., lack of resources, power, and knowledge), advocacy for renters for proper housing management, and continued education and empowerment (Brouwer & Brand, 2008).

The issue of secondhand smoking was also problematic (Tager, 2008). When asked, many were aware of smoking as a trigger for asthma, yet four out of five smokers answered that they were not interested in quitting. Again, this raises the need to provide counseling for smokers at home (Fagnano et al., 2018), probing the reasons behind the lack of smoking cessation intention and surveying any measures to protect asthmatic children from exposure to secondhand smoking (e.g., ban on in-home smoking). As part of Breathe Easy project, if a family member in the sample smoked, a referral was placed to cessation counseling, both through the DC Quitline and the classes offered by Breathe DC.

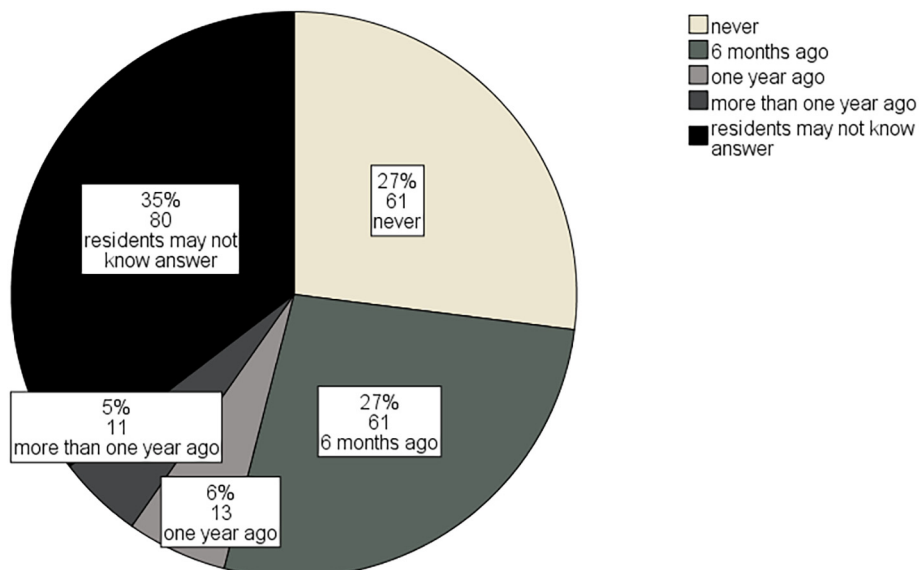


Fig. 2. Pie chart of showing responses as to the last time the furnace filters were changed ($N = 218$).

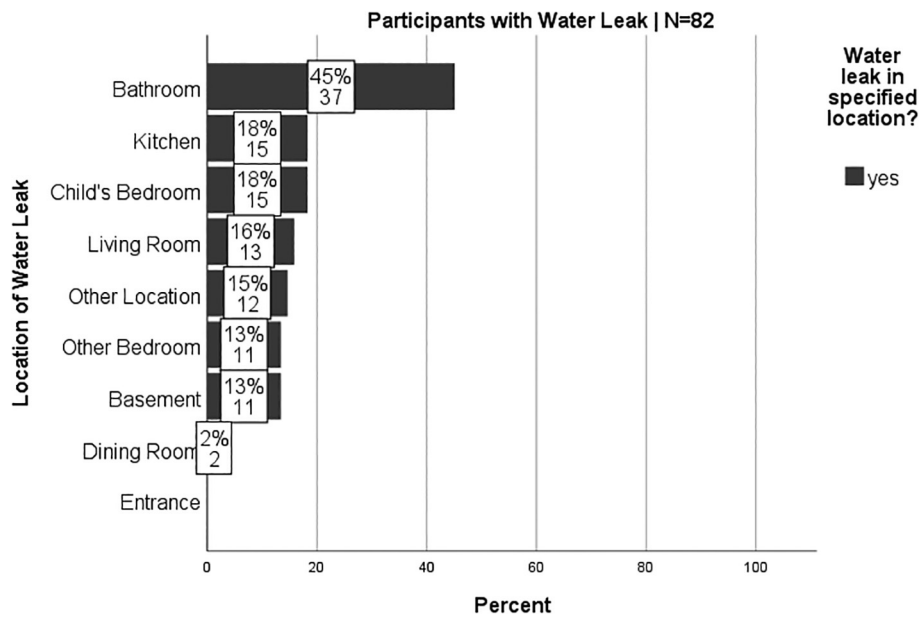


Fig. 3. Bar graph of water leak location (N = 82).

Although asthma costs average \$3100 per patient each year in the United States, the direct costs associated with hospitalizations can create a significant financial burden on low-income families, which is worsened by the cost of caregivers missing work (Nunes et al., 2017). Children also suffer the cost of missing school, leading to poor performance among other school-related concerns (Nunes et al., 2017). Educational resources that explain the direct and indirect costs associated with asthma attacks and receiving emergency care are needed to help mend the gap between caregivers' perceptions of asthma triggers and their behaviors to reduce them.

The children in our study were mostly from African American families with low income, found in previous research to have a higher chance of suffering from asthma (Zahrn et al., 2018) and greater exposure to indoor allergens (Ungar et al., 2010). Asthma is a critical

source of health disparity for African American children and their families (Hines, 2011). Changes in individual awareness and behaviors are critical. However, in addition to that, a systematic approach and community-level support are necessary (Hines, 2011; Stempel et al., 2019): many households in the sample live in multi-dwelling settings where changing air or furnace filter or pest control is implemented by the housing management office or property owners. As a follow-up step to our home visit program, in that case, we sent a letter to the housing management office explaining how the problems can exacerbate a child's asthma. The tobacco smoke outside of their house or heavy dust from traffic can be best regulated with city-level policies, which need more community advocacy efforts. In order to alleviate burdens faced by caregivers and children with asthma, community-level support is necessary to provide a safer home and environment for care (Prather

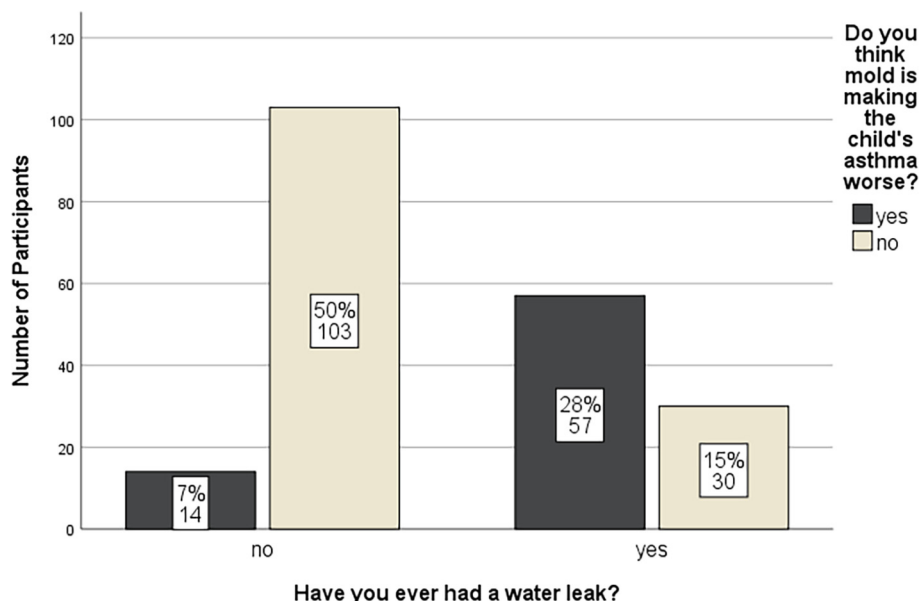


Fig. 4. Bar chart comparing mold and water leaks (N = 204).

et al., 2020). Also, we need to train healthcare providers to be culturally competent so that care for African American families for asthma management can be easily coordinated.

Reduction or minimization of at-home and environmental triggers can be costly. Still, it will help better manage the health of children and eventually lead to more significant save to the health care system (Anderson et al., 2020; Balinsky, 1999, Tolomeo, 2009). Caregivers of children with asthma also report poor quality of life and psychological distress resulting from the stress of dealing with asthma management (Bellin et al., 2013, 2018). Future studies should include follow-up visits where we can measure the effectiveness of the home visit program by assessing changes in the presence of at-home triggers and actions to minimize the exposure to at-home triggers (Brugge et al., 2003). The home visit program in our study included the provision of tailored information and material resources to assist families with trigger reduction and asthma management. Follow-up visits that monitor the progress in at-home trigger reduction, caregivers' knowledge and behaviors, and housing management office's actions in response to the presence of triggers will result in more adequate care of children's asthmatic symptoms and reduced visits to the hospital.

Although our study was limited to the survey of caregivers of asthmatic children, more attention to systematic factors is necessary. Asthma is a multifactorial disease in that both individual, social, and structural factors contribute to its persistent disparities (Sullivan & Thakur, 2020). The political climate and government policies are foundational to asthma incidences. For example, the racial disparities in asthma are consistent with disproportionately adverse health effects experienced among African American communities, resulting from the historic US policy of "redlining" (Beyer et al., 2016; Jacoby et al., 2018). Previous studies have supported a fundamental connection between the structural and social aspects of health and asthma health. It is essential to consider these factors when developing asthma prevention and treatment programs. For example, housing code violations offer an aggregate-level examination of how poor home quality in a cluster may impact asthma outcomes at the population level. Children who live in census tracts in the highest quartile of housing code violation are almost twice as likely to experience asthma-related hospitalizations compared with children in the lowest quartile (Beck et al., 2014; Samuels et al., 2022). This suggests housing code violations or other administrative measures could be used by hospitals or cities to identify high-risk populations (Beck et al., 2014). The US Department of Housing and Urban Development and many local, state level housing authorities have launched Healthy Home Initiatives, such as green housing, smoke-free, and integrated pest management policies to protect children and families from housing-related health and safety hazards. Such new policies focus on implementing protective measures. Research has found that children with asthma living in green housing had fewer asthma attacks, asthma-related hospital visits and school absences (Colton et al., 2015). In addition, a smoke-free policy was found to be associated with a significant decrease in childhood asthma-related emergency department visits for asthma (Ciaccio et al., 2015). Substantial improvements in asthma outcomes will not be made without addressing the underlying systematic factors.

Our study sample was mostly low-income renter households. We acknowledge that low-income renters are particularly vulnerable and have fewer means to address the asthma triggers on their own because of lack of financial resources and power as well as lease restrictions or building-wide problems over which they have no control. Future studies are needed to examine how the system-level factors, such as how the implementation of healthy home-related policies and programs (e.g., green housing, smoke-free building), can effectively reduce renters' exposure to asthma triggers. A report from the Urban Institute (Ganesh et al., 2017) suggested that although healthy home initiatives had been implemented in many public housing sites, building inspectors often overlooked less visible but threatening hazards, such as mold and leaks. More training should be offered so that inspectors can

take a closer look at the rented units to help property owners to resolve these issues and provide healthy homes to their renters (Ganesh et al., 2017). Again, the minimization or elimination of at-home triggers can be achieved with a systematic approach where all stakeholders are held accountable.

Author statement

All authors certify that they have participated sufficiently in the work to take public responsibility for the content, including participation in the concept (ML, JEC, BR, LT, RAA, and JL), design (ML, JEC, BR, LT, and JL), analysis (ML, JEC, BR, and JL), writing (ML, JEC, BR, and LT), or revision of the manuscript (ML, JEC, BR, and LT).

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