

ENVIRONMENTAL DETERMINANTS

Asthma, tobacco smoke and the indoor environment: a qualitative study of sheltered homeless families

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Abstract

Objective: Asthma is common in homeless children with an incidence of 28–40%. There are few published studies investigating asthma in homeless children. This study examines the perspectives of both caregivers and shelter staff regarding challenges and opportunities of caring for children with asthma. **Methods:** A focus group of sheltered parents ($n = 10$) with children who have asthma was conducted to identify barriers to optimal asthma management. Key informant interviews ($n = 6$) were conducted with shelter staff to discuss the shelter systems and policies to address childhood asthma. Data were audio-recorded and transcribed. A representative analysis team performed qualitative theme analysis. **Results:** Key themes across 5 domains were identified: asthma education, access to asthma medication and equipment, asthma action plans, structural barriers to asthma management and environmental triggers. Parents identified multiple asthma triggers present in the shelter environment but cited lack of control as a barrier to remediation. Shelter staff desired elimination of asthma triggers but refer to the lack of resources as the primary barrier. Shelter staff favored a smoking ban on shelter property but named challenges to policy implementation. Both parents and staff identified asthma education and increased access to medications would be helpful. **Conclusions:** Policies to reduce environmental exposures, such as a smoking ban, to asthma triggers has the potential to improve the health of sheltered children with asthma.

Keywords

Attitude to health, caregivers, focus groups, health knowledge, pediatrics, qualitative research

History

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Introduction

Family homelessness is increasing in the United States [1,2]. Homeless children experience health problems secondary to the stress and risks associated with episodic and chronic homelessness: acute illness, such as colds and diarrheal illnesses, and chronic illness such as iron deficiency anemia, obesity, asthma and mental health [3,4]. Asthma is common in homeless children with a prevalence of 28–40% compared with 8% in all children [4–6]. Sheltered homeless children have elevated rates of asthma-associated emergency room visits (28%) and hospitalizations (24%) [5] and are less likely to have a usual source of medical care [7,8]. In addition, children of low economic status suffer disproportionate asthma morbidity and mortality [9]. Since homeless children with asthma are exceptionally vulnerable and difficult to reach, there is an important opportunity to address asthma management during their shelter stay.

The indoor and outdoor environment of a home has a significant impact on a child's asthma. Asthma is exacerbated

by environmental triggers such as dust mites, molds, pet dander and tobacco smoke, all of which can be encountered by sheltered families who have a limited ability to control their living environment [10,11]. Second-hand and third-hand tobacco smoke exposures plague multi-unit dwellings as tobacco smoke airborne particles migrate through ventilation ducts, windows and heating/cooling systems. Tobacco smoke residue remains on household surfaces after smokers have left [12–14], and the smoke metabolites are detected in children living in multi-unit dwellings despite no direct tobacco smoke exposure [15].

Asthma interventions tend to focus on clinics, schools and communities; few programs target homeless shelters [16,17]. There is limited information about asthma in homeless children [5,18–22], and to our knowledge there are no published studies examining the perspective of both caregivers and shelter staff regarding children with asthma. The Stanford School of Medicine pediatric residency training program has a long-standing community partnership with the Shelter Network which provides temporary housing in the Northern California Bay area since the late 1980s. Since 2006, pediatric residents have provided monthly general pediatric health education seminars, such as immunizations, cold/influenza prevention and healthy diets. The shelter

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program estimates that 50% of adults and 29% of teens smoke. The shelter's leadership prioritized asthma as a key health concern for their families after a large number of sheltered families indicated one or more children had asthma. In response to the shelter's request, we conducted a qualitative study to identify challenges of managing childhood asthma in sheltered children from the perspective of caregivers and shelter staff.

Methods

Qualitative data was collected from two groups of stakeholders from one Shelter Network site: parents of children with asthma and shelter staff. Parents were asked to participate in a focus group, while semi-structured interviews were conducted with shelter staff. Since little is known about the topic, qualitative methodology was deemed appropriate to facilitate a greater exploration of the topic and allow for the generation of new hypotheses regarding the challenges faced by this vulnerable population [23]. Both parents and staff were compensated for their time and participation with a small gift card.

Staff recruited parents for focus group participation, from a purposeful sample of all parents currently residing at the shelter that indicated that their child has asthma [24]. In 2010, ten parents consented to participate in a focus group exploring the intersection of homeless shelters and pediatric asthma. The participants were primarily female, 31–53 years-old, and racially and ethnically diverse: Hispanic, non-Hispanic White, Pacific Islander, African American (Table 1). All participants spoke fluent English. Their children with asthma ranged from 19 months to 24 years of age and the majority of children were enrolled in Medicaid. The focus group, designed to last 90 minutes,

was conducted in English by a trained researcher using a semi-structured topic guide that facilitated a directed discussion. This allowed for an open-ended exploration with each domain. The following five domains were drawn from a review of the empirical literature: (1) asthma education and training, (2) access to medications, (3) asthma action plans, (4) structural barriers to asthma management and (5) environmental triggers (Table 2) [10,18,19,25–31].

Key informant interviews were conducted ($n=6$) in the fall of 2010 with a representative subset of shelter staff (case managers, children's coordinator and night shift staff) that indicated oversight and/or implementation of systems and policy issues regarding asthma management. The interviews designed to last 30 minutes, were conducted using a semi-structured interview guide examining four

Table 1. Focus group participant characteristics.

Characteristic	No. (%) $n = 10$
Sex	
Female	9 (90%)
Male	1 (10%)
Age (years)	Range: 31–53
Ethnicity	
White, Non-Hispanic	2 (20%)
Hispanic	4 (40%)
African American	1 (10%)
Pacific Islander	2 (20%)
Other	1 (10%)
Children with asthma	14
Age (years)	Range: 1.5–24
Insurance status of child	
Private	1 (7%)
Public	12 (86%)
Other	1 (7%)

Table 2. Topic guide covering five domains in asthma for focus groups of parents of sheltered children with asthma and interviews of shelter staff.

Domain	Parent Focus Group	Staff Interviews
1. Asthma education and training [28,29,31]	What are the things about asthma that you have questions about? How helpful would it be to have someone come to the shelter to provide information about asthma?	What are opportunities to educate staff, parents and children about asthma? What content should be included during training and how frequently should training be provided?
2. Access to asthma medications [18,19,27]	What challenges do you have getting the medication you need for your child for their asthma?	What are opportunities to change current shelter processes and procedures to improve management and support for children with asthma? What is the feasibility of screening for asthma during the intake process? How should information be documented, stored and made available to staff?
3. Asthma Action Plans [29]	Has your child's doctor given you an asthma action plan for your child? Has this been helpful, why or why not?	How helpful would it be to have an asthma action plan on file for each child at the shelter with asthma? Where should the asthma action plans and medications be kept for access during an emergency? Which shelter staff should be trained to give asthma medications in the event of an emergency?
4. Structural barriers to asthma management [18,25]	What barriers do you have for getting your child to the doctor to be seen for asthma? Where does your child go for medical care?	
5. Environmental asthma triggers [10,26,30]	Are you aware of common asthma triggers? How helpful would it be to have basic information on asthma triggers? What are barriers to reducing asthma triggers at the shelter?	What are opportunities are there to minimize environmental triggers in the shelter? How feasible would it be to: (1) provide hypo-allergenic mattress and pillow covers, (2) conduct deep cleaning before child with asthma move in, and (3) make a limited number of asthma friendly rooms?

domains. These domains mirrored those discussed in the focus groups with parents, with the exception of domain 4: structural barriers to asthma management (Table 2) [10,18,19,25–31].

All qualitative data were audio-recorded and transcribed verbatim, resulting in 13 pages of transcript. Manual transcript-based theme analysis was conducted by an independent 4-person analysis team, none of whom were aware of the study's aims. Theme analysis included an extensive review of the transcripts, by each analysis team member followed by independent highlighting and margin coding for each open-ended question [23,32,33] and identification of exemplary quotes. The analysis team was asked to apply the framework derived from the literature to the analysis process. Overarching themes were discussed in a group analysis session to identify major and minor themes and resolve coding differences by consensus. The "Stanford University Institutional Review Board" approved all procedures, parents and key informants were provided with informed consent.

Results

The qualitative analysis yielded a wide range of responses which are presented with their accompanying representative quotations in Table 3.

Domain 1: Asthma training for shelter parents and staff

Theme 1: Regular training on asthma for parents and staff is essential.

Shelter staff and parents concur that asthma education is important for awareness and prevention of asthma attacks among children living at the shelter. Parents were particularly interested in how to better detect and manage their child's asthma symptoms to prevent asthma exacerbations. One parent participant stated:

I was pretty ignorant about the issues. You know, dealing with the symptoms. . . . I think that is part of the problem for parents, having enough information.

Parents stated more training on asthma triggers would be helpful. Due to high turnover among shelter residents and staff, the staff noted frequent trainings would be necessary to maintain basic knowledge levels of asthma. One staff member said all staff should participate, including case managers, the children's coordinator, front desk staff and the program director.

Theme 2: Regular access to an advice nurse would be helpful for parents.

Parents agreed that regular access to an advice nurse would be helpful in answering questions and preventing "unnecessary panic." It was suggested they could advise parents when to seek physician care, potentially preventing unnecessary clinic trips.

Theme 3: Shelter staff do not feel comfortable giving asthma medications due to the lack of training.

Shelter staff were uncomfortable with giving children asthma medications without training. They voiced concern

with potential circumstances when a parent might not be available to administer necessary medications, leaving staff and/or other parents responsible for helping a child with medications.

Domain 2: Access to asthma medications and equipment

Theme 1: Not all shelter staff members know where to locate asthma medications in the event of an emergency.

Some staff cited confusion regarding, where asthma medications were securely located, whether or not there was a designated location, and how to access them in the event of an emergency. It was unclear whether all or some parents left their child's asthma medications in an accessible location. They surmised that parents likely left the medications locked in their rooms, which they could not access in the parents' absence.

Theme 2: Insufficient equipment for asthma therapies hinders effective asthma management.

Some parents cited problems with having all the components necessary to deliver asthma medications either due to lack of availability at their local pharmacy or being misplaced or lost during transitions from home, school and other residences. One parent noted difficulty getting necessary equipment during afterhours and in emergency situations.

Domain 3: Asthma action plans

Theme 1: Asthma action plans are less useful for parents and more important when children are in someone else's care.

While parents understood the relevance and utility of asthma action plans they reported being comfortable managing their child's asthma without an asthma action plan. They were aware that the plans were filled out by their doctor and provided for their reference. Parents thought that an asthma action plan would be most helpful when their child was in someone else's care.

Theme 2: Shelter staff are universally in support of readily accessible asthma action plans.

Shelter staff readily voiced their support for asthma action plans. They believed the availability of the plans would help them know what to do during emergencies when the child's parent was unavailable. While staff believed asthma action plans would be helpful, they had concerns about parents' ability to have them completed by a physician and provided to their shelter case manager.

Domain 4: Structural barriers to asthma management

Theme 1: Transportation and travel time are barriers to accessing medical care for children with asthma.

Parents reported that transportation and time make it difficult to seek regular medical care. Most sheltered parents rely on public transportation, increasing the time required to travel to doctor appointments and pharmacies. Also, the in-office time required for some asthma treatments was frustrating for some parents.

Table 3. Identified themes and representative quotes from parents of sheltered children with asthma and the homeless shelter staff.

Domain 1: Asthma education and training**Theme 1: Regular training on asthma for parents and staff is essential**

- “I think that all staff should be included. Case managers, program director, children’s coordinator, staff at the front desk, everybody.” – Staff member
- “I was pretty ignorant about the issues. You know, dealing with the symptoms. Until the lady [physician] came. . .she explained it to me, and that is exactly what my kid was having [symptoms] . . . I think that is part of the problem for parents, having enough information.” – Parent

Theme 2: Regular access to an advice nurse would be helpful for parents

- “It would be very useful. . .my kids, they used to have [access to an advice nurse]. . .we avoided a lot of unnecessary panic and running around just because the advice nurse was there.” – Parent

Theme 3: Shelter staff do not feel comfortable giving asthma medications due to lack of training

- “What I think is that we should have a training [on how to administer asthma medications] for all of the staff, because we have graveyard shift, and you know, you just never know [what could happen after hours].” – Staff member

Domain 2: Access to asthma medications**Theme 1: Not all shelter staff members know where to locate asthma medication in the event of an emergency**

- “I don’t know if there is a designated spot for medications, but I assume there would be, but I am not sure where that location is.” – Staff member

Theme 2: Insufficient equipment for asthma therapies hinders effective asthma management

- “Sometimes they [pharmacies] don’t have the whole thing, the mask and spacer. . .my niece had come, and. . .she had the machine and tubing, but she didn’t have the mask and the other part and we couldn’t find or get one in the middle of the night.” – Parent

Domain 3: Asthma Action Plans**Theme 1: Asthma action plans are less useful for parents and more important when children are in someone else’s care**

- “I already know, not that I know everything, but I already know what to do for her, so if something is different or out of our element, I go straight to the doctor. . .I wouldn’t even think to read a piece of paper and see what to do next.” – Parent
- “For family members, when you have little kids, they need to get babysat. Or if you go out for the evening you need to get a babysitter, so you probably would need one [asthma action plan], it would be helpful.” – Parent

Theme 2: Shelter staff are universally in support of readily accessible asthma action plans

- “[Do you think it would be helpful to have an asthma action plan on file?] Definitely.” – Staff member

Domain 4: Structural barriers to asthma management**Theme 1: Transportation and travel time are barriers to accessing medical care for their child**

- “They need to provide cars. . .a taxi or something. . .a voucher. . .something to get you to appointments.” – Parent

Theme 2: Shelter staff identified the lack of connection with a primary care provider as a barrier to care for shelter residents

- “Information alone isn’t that helpful to parents. The parents need a liaison and a connection to a primary provider.” – Staff member

Theme 3: Prioritizing a child’s asthma is difficult while homeless, where stress is high and control is limited

- “I think a lot of the barriers here is a mentality that you get in a shelter, living in a shelter. You know, other than all of the problems, you have a mentality that you’re broken. Everything is, not only your health” – Parent

Domain 5: Environmental asthma triggers**Theme 1: Parents identify multiple asthma triggers present in the shelter environment, but cite a lack of control as a significant barrier to remediation**

- “These carpets are really nasty.” – Parent
- “The blankets are an issue. . .when I opened it up to go to bed, it smelled like it had been on fire, or someone had smoked on that blanket for 20 years.” – Parent
- “The problem is trying to make the room a dust free environment. They [doctors] say this is what your room is supposed to look like – hardwood floors, slip covers. . .it is not possible, so what are you supposed to do?” – Parent
- “When you have a kid with asthma. . .doctors tell you things over and over, and regardless of whether you are in a shelter or not, you have to do the best you can. . .I would clean the vents. . .They can’t do everything for you, I mean, certain things you can control. The carpet cleaning you can’t control, but you can. . .keep your windows open, get an air purifier if you can afford it. You know, stuff like that, it’s not the shelter’s fault that our kids are having these issues with asthma.” – Parent

Theme 2: Staff have a strong desire to eliminate asthma triggers, but cite lack of resources as the primary barrier

- “Have our rugs pulled up. . .and our seats. . .my concern is the fabric seats. . .Everything is donated so we have to use what we have.” – Staff member
- “In a perfect world that would be my ideal. . .we try to do the best we can with the resources.” – Staff member
- “Yes it [use of hypo-allergenic mattress covers] is realistic. And we are thinking about switching to all single beds so that would make their reuse more manageable.” – Staff member

Theme 3: Shelter staff have a strong desire to ban smoking on shelter property, but cite challenges to policy change

- “Do away with the whole thing. . .I would like to get rid of the smoking all together but I know that it is impossible.” – Staff member
- “The key to running a successful homeless shelter is that you cannot have loitering in front of the building. To avoid neighbor complaints they have to smoke on the [shelter] perimeter.” – Staff member

Theme 2: Shelter staff identified the lack of connection with a primary care provider as a barrier to care for shelter residents.

Despite providing shelter residents with resources to obtain health insurance, some shelter staff perceived that residents lacked the necessary connection with a primary care provider. They believed this resulted in a barrier to effective care for children with asthma.

Theme 3: Prioritizing a child’s asthma is difficult while homeless, where stress is high and control is limited.

Parents cited an overall lack of control associated with homelessness as a factor limiting their ability to manage health problems such as asthma. One parent stated:

I think a lot of the barriers here is a mentality that you get in a shelter, living in a shelter. You know, other than all of

the problems, you have a mentality that you're broken. Everything is, not only your health.

Parents agreed the stress associated with their living situation was extremely high and only served to increase their perceived inability to control their child's asthma.

Domain 5: Environmental triggers

Theme 1: Parents identify multiple asthma triggers present in the shelter environment, but cite a lack of control as a significant barrier to remediation.

Shelter parents identified carpets, mattresses, upholstery, ventilation system and second-hand smoke as asthma triggers at the shelter. Parents reported receiving multiple messages from doctors to reduce asthma triggers, but many parents cited a lack of control over their living environment as a primary barrier to remediation. Some parents said they try to clean their rooms and vents when they move in, but there is little they can do to remove many of the asthma triggers. Ultimately, parents noted usage of rooms and furniture by multiple families makes it difficult to expect a trigger free environment.

Theme 2: Shelter staff have a strong desire to eliminate asthma triggers, but cite lack of resources as the primary barrier.

Shelter staff were aware of the challenging living environment and the multiple triggers that exacerbate asthma. The shelter had made several efforts to improve the living environment, such as removing carpet in some public spaces and planning for additional carpets to be replaced with non-carpet alternatives. While staff preferred to replace upholstered furniture with cleanable materials, they used whatever was available and donated since resources are limited. Staff recognized that hypoallergenic mattress covers would be ideal and potentially feasible, but experienced many barriers including cost, uncomfortable plastic covers during summer months and frequent ripping over time. Additionally, shelter staff noted limited staff availability makes it difficult to ensure rooms are properly cleaned between residents.

Theme 3: Shelter staff have a strong desire to ban smoking on shelter property, but cite challenges to policy change.

Smoking on shelter premises was of great concern among staff that was in support of a smoking ban on shelter property, while stating that such a policy would be hard to implement and have negative consequences. One staff member stated:

I would like to get rid of the smoking all together but I know that it is impossible.

They thought that a smoking ban would result in children being left unattended while their parents smoked off site. Since the shelter is located in a residential neighborhood, they worried about a negative response from neighbors if residents smoked off shelter property. In lieu of a smoking ban, staff noted that parents have designated outdoor smoking areas, which are unfortunately located in close proximity to the children's play area.

Discussion

This study identified key modifiable factors to improve the health of sheltered children with asthma including knowledge of asthma symptoms, access to asthma medications and adequate equipment to deliver medications, asthma action plans for caregivers and shelter staff, exposure to second-hand and third-hand tobacco smoke, and lack of ability to control environmental triggers. Knowledge of asthma symptoms, adequate access to asthma medications and asthma action plans, and control or elimination of environmental triggers are important for all caregivers of children with asthma. The themes identified in the first four domains, asthma training, access to asthma medication and equipment, asthma action plans and barriers to access medical care were congruent with prior studies of underserved children with asthma [11,19,34–37].

However, some themes were unique to sheltered homeless families. Shelters house a wide age range of children. Approaches to asthma education and asthma symptom management need to be sensitive to patient's age. The shelter was able to implement new asthma education and training, provided by the pediatric residents, for staff and families. In addition, the shelter environment provides an opportunity for shelter staff to have a role in asthma management for its residents; therefore, education, training and policies for shelter staff for medical emergencies can be important. For example, Shelter Network created "Policies and Procedures" to address asthma treatment plans and health emergencies. These changes demonstrate a willingness and capacity on the part of Shelter Network to make incremental changes and improvements that promote the health and wellbeing of children with asthma, their parents/caregivers and shelter staff.

Another unique theme to sheltered families discussed by the participants was that prioritizing a child's asthma while homeless is difficult because stress is high and control is limited. In this instance, self-management plans like the asthma action plan is a tool for both caregivers and shelter staff to assist in identifying asthma symptoms and providing interventions and guidance on seeking further assistance.

Addressing environmental triggers for asthma exacerbation in a shelter is complex since residents do not feel like they have total control of their environment. The study participants identified cigarette smoke as a problem but also expressed difficulties of implementing a smoking ban policy for the shelter. Cigarette smoke is prevalent at homeless shelters: the rates of smoking among homeless mothers are elevated compared with low-income housed mothers [8]. As asthma is exacerbated by second-hand smoke from immediate exposure and third-hand delayed exposure to deposited particulates [14], eliminating tobacco smoke in homeless shelters could greatly improve the health of children with asthma. Areas where children are found, such as schools and daycare centers already ban smoking [38,39], and clean air laws have made an impact on environmental tobacco smoke exposure, changing tobacco smoke behavior patterns in students [39]. Similar regulations could be considered in shelters where children are housed, although the broader implications for the shelter need to be carefully considered.

Environmental tobacco smoke also affects the health of shelter staff. Elimination of tobacco smoke from public establishments such as restaurants and bars have significantly improved the health and reduced the smoking habits of employees [40,41]. Some homeless shelters have adopted indoor clean air policies; however, these policies vary from shelter to shelter and policies to designate “no smoking areas” are also variable [42]. Shelters housing families can consider creating both indoor and outdoor clear air policies.

The shelter’s outdoor environment was highlighted by parents as an opportunity for improvement, since the layout of the shelter grounds had the designated smoking area adjacent to the children’s play area. As shelter sites are being designed or chosen, indoor and outdoor air pollution should be considered. Since low-income housing and shelters frequently have adult smokers and children, the outdoor spaces could be designed in such a way to mitigate the health impact of the families and staff.

Shelter residents and staff identified economic constraints to remove old carpets, clean furniture, and cover beds. Dust and mold residue in carpets, walls and furniture can be significant triggers of asthma exacerbations [10]. However going forward, the shelters could design the indoor environment to have good ventilation, to prevent mold and mildew growth and hypoallergenic flooring (tile vs. carpet for instance). Of note, with the results of this study, the Shelter Network was able to secure funds to start implementing these changes across its network of shelters.

As with any study, limitations exist. The number of participants in the focus groups was small, although diverse. Our study was set in Northern California and thus may not be generalizable to other settings with differing demographic profiles. In our focus groups, we did not collect data on the duration of asthma of each child. Duration of illness can impact the baseline expertise and knowledge of the caregivers of children with asthma. Despite of these limitations this work provides a rare glimpse into the perspectives of the shelter residents and staff.

This study provides an initial exploration into the intersection of homelessness and children with asthma and generates insights into the challenges of homelessness for children with asthma. The unpredictable nature of homelessness makes it imperative for caregivers and shelter staff to have appropriate education and tools to care for children with asthma and promote greater asthma management and prevention. Families with asthmatic children living in homeless shelters are unable to control their exposure to tobacco smoke and environmental exposures. From the themes identified in this small qualitative study, next steps include a cost analysis of the impact of structural environment and tobacco smoke on the health of children and families in shelters. Clean air policies and site wide tobacco smoking bans should be considered in the development of homeless shelters.

Conclusions

In this study, caregivers identified factors to contributing to the health of sheltered children with asthma. Parents and shelter staff acknowledged the need for asthma education, asthma action plans, improved access to medications and

adequate equipment to deliver medications. Parents identified multiple asthma triggers present in the shelter environment but cited lack of control as a barrier to remediation. Shelter staff favored a smoking ban on shelter property but named challenges to policy implementation. For homeless families, the perceived inability to control and change their environment impacts their ability to improve the health of their children with asthma.

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Declaration of interest

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