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Evaluating the implementation of a multicomponent asthma education program for Head Start staff

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ABSTRACT

Objective: Asthma disproportionately affects minority groups, low income populations, and young children under 5. Head Start (HS) programs predominantly serve this high-risk population, yet staff are not trained on asthma management. The objective of this study was to assess a 5-year, multicomponent HS staff asthma education program in Baltimore City HS programs. *Methods*: All HS programs were offered annual staff asthma education by a medical research team that included didactic lectures and hands-on training. Attendees received continuing education credits. HS staff were anonymously surveyed on asthma knowledge and skills and asthma medication management practices in Year 1 (preimplementation) and Year 5. *Results*: There was an estimated response rate of 94% for Year 1 and 82% for Year 5. Compared to staff in Year 1, Year 5 staff were significantly more likely to report they had very good knowledge and skills related to asthma [odds ratio (OR) 1.63; $p < 0.05$] and were engaged in asthma care activities (OR 2.02; $p < 0.05$). Self-reported presence of asthma action plans for all children with asthma was 82% at Year 1 and increased to 89% in Year 5 ($p = 0.064$). *Conclusions*: Year 5 HS staff reported higher self-assessed knowledge and skills, self-reports of asthma medication management practices, and self-reports of asthma activities compared to Year 1 staff. HS serves high-risk children with asthma, and a multicomponent program can adequately prepare staff to manage asthma in the child care setting. Our results indicate the feasibility of providing efficacious health skill education into child care provider training to reduce asthma knowledge gaps.

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Introduction

Asthma is a chronic health condition that disproportionately affects minority groups, low-income populations, and young children, with Black non-Hispanics having nearly twice the asthma prevalence compared to other racial and ethnic groups (15.8% compared to 7.8% overall in the United States) (1–3). Children under 5 experience the highest asthma hospitalization rates compared to other age groups (4). Interventions are needed that target reducing asthma health disparities in these at-risk groups, specifically low-income and minority preschool children. Asthma can affect the quality of life for young children and their families by impacting the child's ability to participate in physical activities, school attendance, and caregiver or parent's employment due to caring for a sick child (5–7). Over half of missed school days are asthma related, with school-age children on average absent 1.5 more days compared to children without asthma (8). Significant school absenteeism is associated with delayed school readiness and less optimal academic achievements (8, 9). When children miss school, family members may experience barriers in providing care that results in missing work opportunities or other schedule interruptions. Given the impact of asthma on school attendance and overall child development, there is a need for asthma to be addressed in the school setting.

Child care providers in school settings rely on nurses to address health issues in the classroom and frequently report little or no asthma-specific education during in-service trainings (10). Children can spend around 30 hours per week in child care or school and during this time, child care providers are the primary source of interaction with children; thus, they play an important role in asthma management (10). However, there is a gap in asthma knowledge in child care staff, particularly for those caring for children under 5 (10, 11). Child care providers are expected to make decisions regarding treatment and management of asthma symptoms, but are not provided with sufficient resources or adequate training on these topics (11). Lack of adequate asthma knowledge can affect the quality of care provided to children in childcare programs and may result in delay of appropriate treatment (10). Interventions targeting asthma education for child care staff have shown promising

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results in improving asthma outcomes for preschoolers (12, 13). These interventions include educating staff on asthma management strategies, creating asthma-friendly centers, and utilizing staff members to educate parents on asthma, and have resulted in improved outcomes such as child's asthma control (decreasing symptomatic days, asthma-related emergency room or hospitalization visits), decreasing daycare absences, and increasing parental confidence in managing asthma (12). Our research study adds to the literature on asthma education interventions for child care staff by focusing on Head Start, which serves preschoolers who may experience more variability in symptom presentation after early diagnosis compared to school-age children.

Head Start is a federally funded national preschool program that targets low-income children to provide comprehensive services to improve school readiness. Head Start is a collaborative community-based setting where strong partnerships exist between parents and staff. It is an enriched environment for asthma, with Baltimore City programs reporting 30% of children having an asthma diagnosis (4, 14). Coordination of asthma care and discussions of other health-related topics are part of Head Start's performance standards, but there are no specific guidelines on provision of staff training in asthma management (15–17). There are gaps in the literature on mechanisms to provide asthma education in a preschool setting in terms of content and delivery of education, as well as sustainability of asthma education interventions. The Asthma Basic Care in Head Start (ABC-HS) study targets preschoolers with asthma enrolled in Baltimore City Head Start programs by providing multilevel asthma education, which includes staff training and survey of asthma knowledge and practices, family engagement in asthma management activities at Head Start, and policy advisement. The objective of this paper is to evaluate the impact of a multicomponent staff education program in Baltimore City Head Start staff on staff asthma knowledge, skills, and practices by comparing preimplementation (Year 1) to post implementation (Year 5).

Methods

Multicomponent intervention description

Our 5-year multicomponent staff asthma intervention included asthma-specific staff education and research team participation in Head Start health advisory committees, health fairs, and parent workshops to encourage engagement with Head Start staff on asthma. Figure 1 provides information on the multicomponent intervention and Tables 1 and 2 serve as further references for details on core education content as well as frequency of delivery modalities, respectively. All educational activities were led by the research coordinator who received in-depth and ongoing asthma training from the study investigator (M.E.). The study investigator is a clinical psychologist with extensive asthma training, and the research coordinator (E.R.) has public health training and background in community-based health education. From 2011 to 2016, Head Start programs were offered asthma-specific education by Johns Hopkins School of Medicine

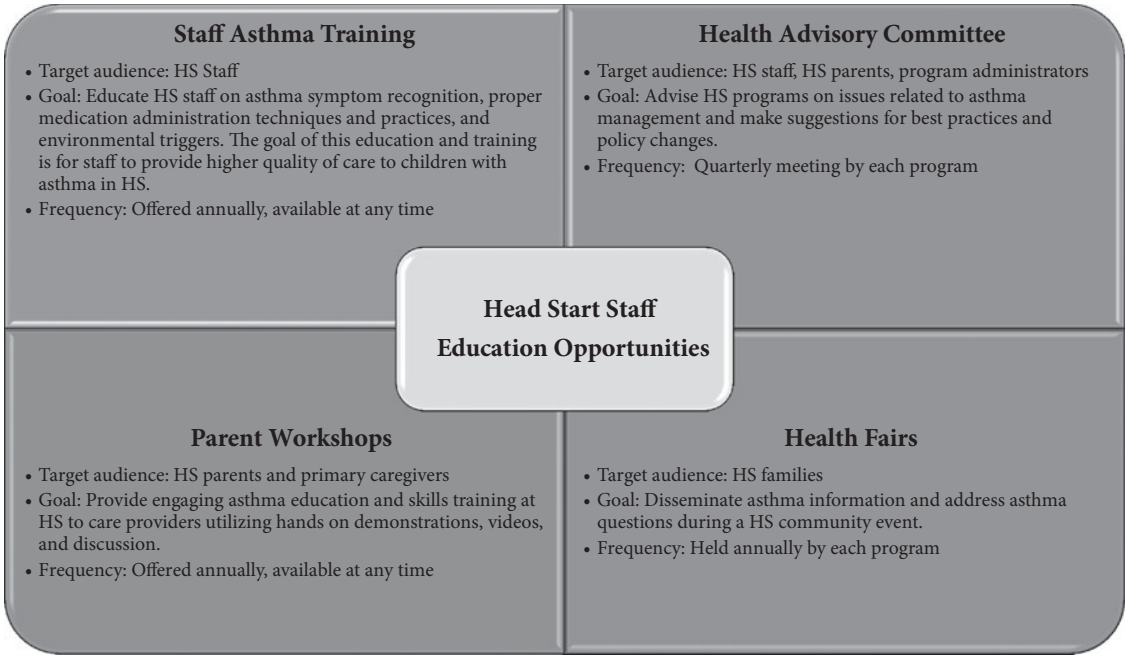


Figure 1. Head Start staff education opportunities.

Table 1. Components of staff didactic asthma training.

Component	Topic covered	Example of how presented
Symptom recognition (40 minutes)	• Asthma pathology • Uncontrolled vs. controlled asthma • Types of symptoms • When to call doctor/911	• Images • Video of symptoms • Discussion • Didactic
Medication administration (40 minutes)	• Asthma action plans (AAP) • Methods of administration • What to check before administering rescue medication • Controller vs. rescue • When to visit doctor	• Review AAP and how to read • Hands on training with spacer and inhaler • Didactic • Images
Environmental triggers (40 minutes)	• Common triggers in school and at home • How to limit exposure • What to do in classroom • How to talk with parents about secondhand smoke	• Didactic • Discussion • Role playing

Table 2. Research team asthma activities at Baltimore City Head Start.

	Year 1 (2011–2012)	Year 2 (2012–2013)	Year 3 (2013–2014)	Year 4 (2014–2015)	Year 5 (2015–2016)
Head Start programs	13	13	13	6	5
Children served	1368[1]	3473	3512	2777	2241
Staff asthma training	0	6	4	3	3
# Head Start programs trained	0	5	3	2	3
Staff formally trained	0	235	140	20	124
Health advisory committee meetings	2	19	16	12	13
Parent workshops	0	6	11	7	7
Health fairs	9	8	11	6	9
Other[2]	0	3	1	2	10

Note. [1]Only a portion of Head Start programs were screened during Year 1 due to time limitations in ability to screen during the school year. [2]Other refers to Head Start anniversary parties and asthma education/study recruitment tables that were set up at Head Start programs during drop off and pick up times.

at least four times annually, as well as during Head Start events (see Figure 1). The Head Start staff asthma education and training was adapted from an evidence-based intervention developed by our research group (18). Free continuing education credits approved by the Maryland State Department of Education were provided to Head Start staff for participation. Topics covered in the asthma-specific training included asthma symptom recognition, medication administration, and environmental triggers (see Table 1). All topics were covered during a single 2-hour training coordinated with Head Start programs during staff development days or other times when child care staff were available for training. Interactive training elements were incorporated through the use of videos, open discussion about challenges to asthma management, and hands-on training with inhalers, spacers, and nebulizers (see Table 1). Given the significant impact of secondhand smoke exposure on children with asthma, staff were also given strategies for talking with parents about reducing secondhand smoke exposure.

In addition to formal asthma training, the research team integrated into the Head Start environment so as to become a trusted resource and partner in addressing asthma. Over the course of the study, our research team conducted a variety of asthma-related activities at all Head Start programs throughout the year (see Table 2). Head Start health fairs were attended annually by the research team and were part of Head Start efforts to increase family attendance and participation in program activities. Research staff shared information with families and staff during Head Start health fairs on asthma symptoms, management, and environmental triggers. Head Start programs invited the research staff to sit on quarterly health advisory committee meetings, which offered the opportunity to discuss health policies and questions including those related to asthma management and treatment at individual programs. Parent workshops were offered by research staff at individual Head Start programs with the goal of engaging families in asthma management and treatment including symptom recognition, asthma medications and accessories, and environmental triggers. These parent workshops were brief, lasting 15 to 30 minutes, and were conducted at Head Start during regularly scheduled parent meetings or in the mornings at drop-off time with varying group sizes (3 to 30 parents). Some nonteaching staff were also present during these parent workshops, and educational materials were provided to all staff attendees. Parent workshops were open to all Head Start parents and while research staff requested that Head Start target parents of children with asthma, this did not always result in parent workshop groups being comprised of solely parents of children with asthma. An educational website was made available to Head Start families and staff that was developed and maintained by the study team: http://abcasthmaheadstart.org/. This website contains links to educational materials, asthma care and management handouts, and links to videos illustrating asthma symptoms and appropriate medication administration techniques. Participation in any of the learning opportunities was at the discretion of the Head Start programs' interest and availability. If Head Start programs expressed interest in holding a parent workshop,

Table 3. Sociodemographic characteristics of Head Start staff.

	Year 1* % (n)	Year 5* % (*n*)	*P* value
Gender	*n* = 465	*n* = 151	0.693
% Female	95.48% (444)	94.70% (143)	
Ethnicity	n = 465	*n* = 150	0.326
African American	87.53% (407)	88.67% (133)	
Caucasian	6.02% (28)	4.67% (7)	
Asian or Pacific Islander	0.65% (3)	2.00% (3)	
Hispanic	2.37% (11)	3.33% (5)	
Other or more than one	3.44% (16)	1.33% (2)	
Age	*n* = 466	*n* = 150	0.001*
Under 29 years	20.60% (96)	2.67% (4)	
3039 years	28.54% (133)	21.33% (32)	
4049 years	25.75% (120)	32.00% (48)	
5059 years	19.74% (92)	32.00% (48)	
Over 60 years	5.36% (25)	12.00% (18)	
Education level	*n* = 465	*n* = 158	0.001*
Some high school	1.72% (8)	1.90% (3)	
High school Graduate/GED	35.70% (166)	17.72% (28)	
Associate degree	14.84% (69)	22.15% (35)	
College	30.32% (141)	31.65% (50)	
Post graduate	17.42% (81)	19.62% (31)	
Other	0%	6.96% (11)	
Number of years worked in Head Start	*n* = 464	(*n* = 151)	0.001*
<1 year	11.85% (55)	0%	
15 years	33.84% (157)	0%	
610 years	20.69% (96)	29.14% (44)	
1115 years	16.59% (77)	29.14% (44)	
>15 years	17.03% (79)	41.72% (63)	
Head Start position	*n* = 466	*n* = 151	0.808
Director	2.36% (11)	1.99% (3)	
Teacher	37.55% (175)	41.72% (63)	
Family service Coordinator	15.45% (72)	11.92% (18)	
Teacher's assistant	35.19% (164)	34.44% (52)	
Other	9.44% (44)	9.93% (15)	

Note. *Year 1 and Year 5 values contain discrepancies in total number of surveys due to (1) differing sampling sizes between Year 1 and Year 5, (2) missing data, and (3) observations removed from Year 5 due to staff members not being at Head Start for at least 5 years.

then research staff visited the program. While no asthma education was directly provided at some of these engagement activities, informational handouts were made available to staff and these presented opportunities to remind Head Start about availability of asthma education.

Participants

All Head Start staff were eligible to participate in all components of the multicomponent asthma intervention, regardless of participating in research components. Table 2 provides detailed information regarding level of participation by Head Start staff members in formal asthma training. Consenting Head Start staff were surveyed in Year 1 and Year 5 (see Table 3). Participants were surveyed anonymously to retain participant privacy since surveys were collected by the Head Start administrators. Therefore, Year 1 and Year 5 respondents were not necessarily the same individual at each time point, and due to the high frequency of staff turnover, we were unable to assume whether most individuals completed surveys at both time points. The study was approved by Johns Hopkins School of Medicine Institutional Review Board.

Procedures

All Baltimore City Head Start staff were distributed surveys as part of this multicomponent asthma education intervention before and after implementation of this 5-year education program. Staff were anonymously surveyed at the start of the study in 2011 to 2012 (Year 1) and at the end of the study in 2015 to 2016 (Year 5). Staff were given approximately 2 weeks to complete the survey and were compensated $10 for their time. The survey took approximately 20 minutes to complete.

Measure: Head Start staff survey

The survey contained 48 items to assess demographics, asthma knowledge and skills, Head Start asthma management policies and practices, and staff asthma activities related to management and care. Asthma knowledge and skills was evaluated with one survey item, which was a self-assessment based on a 4-point Likert scale. Head Start asthma management practices survey items asked about location of medications, availability of asthma action plans, and availability of asthma education programs for Head Start children, parents, and staff (five survey items; see Table 4). Head Start staff asthma activities and policy questions asked about who cared for a child during an asthma attack, what activities were personally performed by the surveyed staff member, how often were asthma treatment activities performed, and what proportion of overall asthma activities were completed by surveyed staff member (4 survey items). Figure 2 as well as Tables 3 and

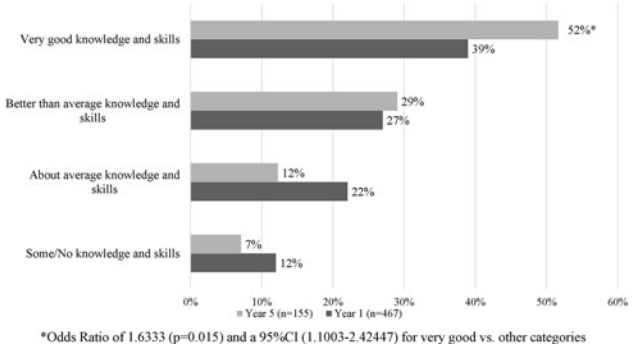


Figure 2. Head Start staff self-reported knowledge and skills in asthma management.

Table 4. Staff asthma management practices and family programs.

	Year 1* % (*n*)	Year 5* % (*n*)	*P* value
Location of children's medication	*n* = 465	*n* = 152	0.001*
• Main office	2.80% (13)	0 %	
• Classroom	84.30% (392)	97.37% (148)	
• Other	12.47% (58)	2.63% (4)	
• Don't know	0.43% (2)	0%	
My Head Start has doctor-prescribed asthma action plan for the following:	*n* = 442	*n* = 149	
• All children with asthma	81.90% (362)	89.26% (133)	0.064
• Some children with asthma	6.79% (30)	6.71% (10)	
• No children with asthma	3.17% (14)	0.67% (1)	
• Don't know	8.14% (36)	3.36% (5)	
Program in Head Start for teaching children how to manage asthma	*n* = 465 28.60% (133)	*n* = 149 36.91% (55)	0.08
Program in Head Start for teaching parents about managing asthma	*n* = 457 55.58% (254)	*n* = 151 71.52% (108)	0.003*
Staff attended any asthma education program in the last 2 years	*n* = 457 65.86% (301)	*n* = 155 67.10% (104)	0.779

Note. *Year 1 and Year 5 values contain discrepancies in total number of surveys due to (1) differing sampling sizes between Year 1 and Year 5, (2) missing data, and (3) observations removed from Year 5 due to staff members not being at Head Start for at least 5 years.

5 provide more information regarding specific survey questions and answer options.

Statistical analyses

Analyses were conducted using STATA 14.0. Chi square, Fisher's exact, and logistic regressions were done to compare responses on variables of interest during Year 1 and Year 5. Participants with missing data values were not included in analyses for variables of interest. Outcomes included staff asthma management practices (asthma-specific education, medication administration and management practices, and asthma action plans), staff asthma activities (frequency, type of asthma management and/or care, undertaken by staff), and staff knowledge and skills in caring for a child with asthma. Chi square and Fisher's exact were used for all staff asthma management practices variables and type of staff asthma activities. Logistic regressions were done for the following variables of interest: frequency staff asthma activities, asthma activities undertaken by staff, and staff knowledge and skills in caring for a child with asthma. Categories for logistic regression analyses are detailed in respective (Tables). *P*-values <0.05 were considered statistically significant. Analyses for staff asthma management practices were not adjusted for demographic differences due to survey items focusing on Head Start program practices rather than individual-level factors of asthma management in Head Start. Demographics were compared between the two different survey years. We excluded Head Start staff in Year 5 who indicated fewer than 5 years' experience working with Head Start ($n = 148$) from between group analyses for individual-level staff asthma management practices to ensure that they were involved in Head Start preimplementation of the program. Adjusted logistic regressions were used to account for between group differences in demographic characteristics.

Results

There were initially 13 Head Start programs in Baltimore City, which were reduced to 5 by the conclusion of this study due to funding cuts. Overall, 16 asthma-specific staff training sessions, 62 health advisory committee meetings, 43 health fairs, 31 parent workshops, and 16 other activities were conducted by the research team. The number of staff trained varied from year to year with no Head Start staff provided an asthma training during Year 1 (see Table 2).

There was a response rate of 94% ($N = 470$) in Year 1 and 82% ($N = 307$) in Year 5 of Head Start staff members participating in the survey. These response rate estimates are based on Head Start provided estimates of the number of staff employed at each program. Of note, because of funding cuts, programs consolidated and the number of staff and enrolled children decreased between Year 1 and Year 5. Despite these changes, staff-to-student ratios in the classrooms did not change and represented a similar work load at both time points. Head Start staff who completed surveys were predominantly African American females of ages ranging from under 29 to over 65 with various roles including teachers, teacher assistants, family service coordinators, directors, and others (see Table 3). There were no statistically significant differences between Year 1 and Year 5 groups on race, gender, role in Head Start, or number of years of working in Head Start. There was a significant increase in educational level, with staff more likely to have a bachelor's degree or higher in Year 5 compared to Year 1. Age was significantly different between the two groups, with Year 5 staff being older than Year 1, but this was only found when removing Head Start staff with less than 5 years of experience. Except as noted, even after limiting Year 5 data (reduced to $N = 159$) to those who worked in Head Start for at least 5 years, findings related to staff reports of knowledge/skills and asthma activities remained the same as the full Year 5 sample.

Table 5. Staff asthma activities.

	Year 1 % (*n*)	Year 5 % (*n*)	Odds ratio (95% CI)	*P* value
Which asthma activities do you personally do?	*n* = 450	*n* = 137		
• Give oral or inhaled asthma meds	68.22% (307)	76.64% (105)	n/a	0.059
• Supervise nebulizer treatment	25.11% (113)	27.01% (37)		0.656
• Handle asthma emergencies	30.67% (138)	32.85% (45)		0.630
• Teach children about asthma	7.78% (35)	7.35% (10)		0.870
• Teach parents about asthma	10.00% (45)	10.95% (15)		0.748
• Talk to families about asthma	28.00% (126)	31.39% (43)		0.443
• Other	3.33% (15)	2.19% (3)		0.497
• None	13.56% (61)	5.88% (8)		0.015*
Of people who take care of children's asthma at my site, I personally do the following:	*n* = 452	*n* = 141		
• All of the asthma care activities	11.06% (50)	20.57% (29)	2.02 (1.30–3.14)[a]	0.002*
• Most of the asthma care activities	14.16% (64)	15.60% (22)		
• Some of the asthma care activities	32.74% (148)	35.46% (50)		
• Very little of the asthma care activities	22.57% (102)	12.06% (17)		
• None of the asthma care activities	19.47% (88)	16.31% (23)		
How often do you personally care for a child having an asthma attack or breathing problem at your site?	*n* = 454	*n* = 149		
• Daily	5.07% (23)	8.72% (13)		0.772
• Weekly	5.50% (25)	2.68% (4)		
• Monthly	16.30% (74)	9.39% (14)	0.984	
• Every few months	24,45% (111)	28.86% (43)	(0.8841.096)[b]	
• Never/rarely	29.52% (134)	23.49% (35)		
• As needed/other/don't know	19.16% (87)	26.84% (40)		

Note: All values were adjusted for age and education between groups. Year 1 and Year 5 values contain discrepancies in total number of surveys due to (1) differing sampling sizes between Year 1 and Year 5, (2) missing data, and (3) observations removed from Year 5 due to staff members not being at Head Start for at least 5 years.

*Statistically significant

[a]Comparison groups for adjusted logistic regression: All/Most/Some vs Other Categories

[b]Comparison groups for adjusted logistic regression: Daily/Weekly/Monthly vs. Other categories

Staff asthma management practices

Location of asthma medications was predominantly reported to be in the classroom, with Year 5 reporting higher rates than Year 1 (97% compared to 84%, respectively, $p = 0.001$). Other asthma management practices were higher in Year 5 compared to Year 1, but were not statistically significant (Table 4). The presence of asthma action plans for all children with asthma was at 82%, with a rise to 89% in Year 5 ($p = 0.064$). Staff's self-report of attending an asthma education program within the previous 2 years remained steady (66% Year 1 vs 67% Year 5), but there were increases during Year 5 in staff reporting programs in Head Start for teaching children (8% greater, $p = 0.08$) and parents about managing asthma (16% greater, $p = 0.003$).

Staff asthma activities and knowledge/skills

Staff asthma activities and knowledge/skills were evaluated by self-reports of knowledge and skills, activities personally completed, frequency of asthma management activities, and proportion of program-wide asthma activities performed by the staff member (Table 5). Reporting of Year 5 staff providing oral or inhaled medications to children in school was 8% higher compared to that of Year 1 staff, although not statistically significant ($p = 0.059$). There was 10% greater reporting during Year 5 of staff personally doing all of the asthma care activities compared to Year 1 ($p = 0.002$). There were no significant differences found in frequency of caring for children having an asthma attack or breathing issues at the Head Start site between Year 1 and Year 5. However, it should be noted that over both time points at least 50% of surveyed Head Start staff reported having some involvement in asthma management during the course of the school year. There were no statistically significant differences in staff performing any of the following asthma activities between Year 1 and Year 5: supervising nebulizer treatments, handling asthma emergencies, teaching children and parents about asthma, talking to families about asthma, or no asthma activities (Table 5). There was a 13% higher proportion of staff self-reporting they had very good knowledge and skills related to asthma in Year 5 (OR 1.63, $p = 0.015$; Figure 2).

Discussion

This multicomponent staff asthma education reached all Baltimore City Head Start programs. From Year 1 to Year 5, there were higher self-reported ratings of staff asthma knowledge and skills, staff being more actively engaged

in administering inhaled medications for asthma, and asthma medications being available in the classroom. Similarly, a higher proportion of children with asthma were reported to have an asthma action plan in Year 5, although this was not statistically significant. There was minimal variation in proportion of staff attending any asthma education program within the last 2 years, frequency of staff reporting caring for a child having an asthma exacerbation, and staff engaging in asthma activities, such as teaching or talking to families about asthma and handling asthma emergencies. These findings support previous literature that education and skills training can increase positive behaviors for asthma care and management (13, 19, 20).

Child care providers play an important role in a child's asthma management. Given that over half of surveyed Head Start staff noted participating in asthma management activities, this presents an important target for provision of additional education and support of child care providers. Child care staff are often given insufficient resources and training to ensure proper asthma management and treatment occurs during school hours (11). Moreover, Head Start's limited budget often hinders the presence of nurses on-site to provide support and serve as a resource for child care providers, resulting in greater burden on child care staff to manage asthma. While nearly two-thirds of the Year 1 Head Start staff surveyed reported completing asthma-specific training, this is not typical of other Head Start locations. The limited data on Head Start staff completing asthma education places estimates at around 40% to 45% (21, 22). Although the number of Head Start staff reporting attending an asthma education program within the previous 2 years did not improve much during the course of the study, this could be explained by biases in staff remembering time frame of educational programs as well as a slight carryover effect from previous studies conducted by our research staff, which also included educational activities with Head Start. Any potential carryover effect from previous studies was not able to be adequately analyzed due to the varying levels of recollection from the staff members as to which agency provided the formal asthma education. More specifically, staff were surveyed anonymously, which did not allow for matching of responses. Head Starts experience frequent staff turnover, with some staff members transferring to other Head Start programs with different asthma practices or others returning after a period at another non-Head Start child care center.

Preschoolers are particularly at greater risk for adverse outcomes given the great symptom variability during initial asthma presentation, so it is of great importance that all caregivers, including child care providers are able to appropriately manage and treat asthma. Child care providers for preschoolers have been shown to have positive attitudes toward having children with asthma in their classrooms but lack confidence and resources to evaluate and treat asthma symptoms (11). Traditional models of educating parents of children with asthma have focused on the role of healthcare providers in the education delivery process; however, multiple research studies have shown that this is inadequate, particularly for low-income urban families (23). Additionally, this traditional model also assumes that either the parent or healthcare provider will provide the school with the necessary knowledge and skills to manage asthma. Given that the majority of children with asthma can have acute episodes managed outside of a clinical setting, by following a physician-prescribed asthma action plan, interventions aiming to reduce asthma health disparities should target community settings that directly work with families.

Our study is one of the first to demonstrate how a multilevel asthma education program for child care staff influences staff asthma management activities in a community-based setting. Head Start is a particularly important population to target, given the asthma health disparities among populations primarily served by Head Start (4, 9, 24, 25). National Head Start performance standards indicate the program must address health issues (oral health, nutrition, secondhand smoke), but there are no explicit guidelines for staff asthma education (17). Improved asthma knowledge and skills among Head Start staff would help to improve the quality of care that is provided to the child in the preschool program and may reduce school absences.

Head Start programs are continuously searching for community partners that can provide families and staff with training and education to better serve children's health needs. While some community partners provide one-time education programs, our multicomponent asthma education is integrated across multiple levels (parent only, Head Start staff only, and parent/Head Start staff) and elicited significant changes in staff behaviors, knowledge, and asthma activities. A multicomponent approach could be more robust and encourage communication between parents and child care staff that may not be provided by one-time programs. These integrated activities had the goal of not only raising awareness of asthma, but also focusing staff efforts on asthma management. We provided formal asthma education to Head Start parents and staff groups separately during parent workshops and staff education sessions. We informally targeted Head Start staff and parents jointly during health fairs and health advisory committees. The results of this study indicate the feasibility and potential importance of integrating asthma education into child care provider training. Integration of asthma education in multiple

settings and time points allows for repeated exposure to asthma information and the opportunity to ask questions or receive guidance regarding asthma management barriers or issues. While a single didactic training can provide child care staff with some information on asthma management, it is not sufficient to alter asthma management activities on a program-wide level. Repeated exposures to education opportunities are important, particularly for Head Start which experiences frequent staff turnover and enrollment changes throughout the year which may result in additional children with asthma at the program. Next steps should include examining the impact of staff asthma training and education on the link to child asthma outcomes including school absences. Additionally, incorporation of skills related to collaborations between family and staff on the child's asthma management are needed.

Limitations

Limitations of this study are associated with the sampling methods in surveying Head Start staff. This anonymous survey was completed pre- and post implementation of the multicomponent staff education and there were no controls and no matching of surveys done. Participant privacy was also taken into consideration while these surveys were being collected by Head Start administrators, so the anonymous nature prevented matching. Asthma knowledge and skills assessment via a single question was an additional limitation in evaluating the scope of knowledge and skills of the childcare provider. Unfortunately, due to the broad scope of the survey and it being completed in a work setting, there were limitations in survey length so as to not overly burden participants. Another sampling limitation outside of the control of the research team was the reduction in work force. While this reduction in the work force allowed for less equitable sampling sizes, we found there were minimal group differences demographically. These demographic differences were adjusted for appropriately and while there were fewer staff members, workloads remained relatively the same due to mandated licensing requirements for classroom ratios. Head Start staff do experience greater burden in caring for children with asthma management due to budget restrictions not allowing for nurses to be available on-site universally. However, this is a universal burden across most Head Start programs prior to study onset and did not vary during the study period. Additionally, these surveys are self-reported perceptions of knowledge, skills, and practices related to asthma management and may not reflect actual change in these aspects. Moreover, this survey did not specifically ask about changes in school-based environmental practices even though this was a component of the education intervention. Previous research has demonstrated the impact that multilevel education can have on improving practices related to asthma care, so evaluation of whether education aids in behavior and knowledge changes was not under review.

Conclusions

Multi-component asthma education for Head Start staff resulted in significant improvements in some staff asthma management practices, self-assessed asthma knowledge and skills, and activities. While this multi-component program did not see significant improvements across all outcomes of interest, there were notable improvements across the board that are important to take into consideration. Additionally, more universal uptake of the multiple components of this program could have helped boost results across Head Start programs. More universal uptake would have involved more frequent utilization of asthma training of child care staff, parent workshops, and greater involvement in health advisory committees and health fairs by those programs that had minimal involvement in these activities. Pediatric asthma represents a significant health disparity that should be addressed with multi-level community-based interventions. Future steps in addressing asthma at the community level should look at integrating asthma specific education into child care licensure and providing asthma education at multiple levels (family, staff, and community). Future research should also examine the effect a multi-level asthma education program for child care staff on child asthma outcomes.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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