An Assessment of a Pilot Asthma Education Program for Childcare Workers in a High-Prevalence County

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OBJECTIVE: To assess changes in knowledge, attitudes, and intentions among childcare workers before and after an asthma-management-education session. METHODS: Between May and August 2004 five asthma-education sessions were provided for childcare workers from Sonoma County, California. A total of 71 childcare workers came to the sessions. Before and after each session we assessed the participants' knowledge, attitudes, and intentions about asthma. RESULTS: Participant knowledge of asthma causes (eg, air quality, common cold) and interventions (eg, bronchodilators), asthma trigger control plans, ability to identify a child who needs medical attention for asthma, and comfort level with caring for a child with asthma increased significantly. Their knowledge about asthma triggers, early warning signs, and asthma control plans was high before and after the asthma education intervention. Their stated intentions to utilize their asthma knowledge were high before and after the training, which may indicate willingness to implement knowledge and attitude change. CONCLUSIONS: Asthma education can improve childcare workers' knowledge about asthma-control strategies and attitudes toward asthma interventions. *Key words: asthma, respiratory care, childcare workers, asthma education, asthma management, community health.* [Respir Care 2008;53(12):1691–1696. © 2008 Daedalus Enterprises]

Introduction

The prevalence of asthma, which is the most common cause of childhood disability,[1] more than doubled, from 3.6% to 7.5%, between 1980 and 1995.[2] In 2005, 13% of children under the age of 18 had been diagnosed with asthma at some point in their lives.[3] Prevalence increases with age,[4] and asthma may reduce physical activity.[5] Morbidity associated with first diagnosis of asthma increased the total number of hospitalizations of children 0–4 y old (a rise from 37 to 55 per 10,000 population), and the death rate of asthmatic children 0–4 y old rose from 29 to 32 per 10,000 population between 1980 and 1999.[6]

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According to the American Lung Association, asthma care costs total $14.7 billion annually. The indirect costs due to lost productivity (including death) total approximately $5 billion per year.[7] In comparison to children without asthma, children with asthma incurred 88% more medical costs, required 2.8 times as many prescriptions, made 65% more out-patient visits, and had twice as many in-patient days.[8]

Exposure to indoor allergens and irritants plays an important role in triggering asthma attacks.[9-11] Indoor air quality also plays an important role in controlling the fre-

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quency and severity of asthma attacks among children. Many triggers, such as molds, dust mites, cockroaches, animal dander, tobacco smoke, and wood smoke, can cause an asthma attack,[12,13] so careful management of indoor air allergens may decrease exposure and consequent asthma-related illness.[14]

Previous research indicated that asthma education interventions for parents of children with asthma improved knowledge and attitudes that enhanced their child's asthma management.[15-18] Other studies focused on the ability of school health centers[19] and case managers[20] to assist with asthma management. Childcare workers also may care for children with asthma, but no study has described surveys of or educational interventions in childcare workers to improve their pediatric asthma management. A study of the related allergic response of anaphylaxis found that education significantly increased childcare workers' ability to recognize and respond to anaphylaxis.[21] Because the average American child of a working mother spends more than 30 hours per week in childcare,[22] it is crucial that childcare workers are familiar with asthma triggers, symptoms, and management.

We evaluated a pilot asthma education intervention for childcare workers, and surveyed the participants' knowledge, attitudes, and intentions about asthma management before and after the educational intervention.

Methods

Human subjects research approval was granted by the institutional review board of the University of Kansas School of Medicine-Wichita, Wichita, Kansas.

Educational Intervention

A pilot educational intervention on asthma management was developed specifically for childcare workers by health-education experts at the HealthSource at Kidsake, a health-care education and training organization hired by the American Lung Association for this project. Three educational techniques were used in the asthma education sessions: a video that describes asthma triggers and an asthma control plan; a lecture about asthma treatment for children; and an applied-learning segment with "hands-on" demonstrations of nebulizers, inhalers, and spacers. A master-level health educator conducted the asthma education sessions. Four sessions were offered in English, and one in Spanish. The sessions were available at no charge to any childcare worker in Sonoma County, California. Registration was available via mail, telephone, or walk-in.

Survey Instrument

In an extensive literature search we found no existing instrument to adequately measure program impact in childcare workers, so we developed a survey instrument on key topics and components of effective asthma interventions identified in other research.[12,15,16,23] Our survey has 2 construct sections: knowledge, and affect (ie, attitudes and intentions about asthma). The identical pre-intervention and post-intervention surveys contained 12 items designed to measure changes in asthma knowledge, attitudes, and intentions. Six true/false items assess the respondent's knowledge of asthma triggers, early warning signs, components of an asthma control plan, and asthma treatment. Four 4-point Likert-scale questions assess the respondent's level of comfort with and ability to identify a child who needs medical attention for asthma, familiarity with the components of an asthma control plan, likelihood of having an asthmatic child in the childcare facility, and care for a child with asthma. Two more 4-point Likert-scale questions assess the respondent's intentions to act, by assessing confidence in (1) telling a parent not to smoke in the presence of a child, and (2) making changes in the childcare facility to reduce asthma triggers.

We devoted substantial time and energy to planning and designing the survey instrument, and we employed statistical procedures to assess its reliability. Cronbach's alpha,[24] which measures the consistency of the scale, examines the variance of each item in relationship to the variance of the overall scale. If the scale is poorly constructed, the Cronbach's alpha will equal 0.0, which indicates poor consistency. The closer Cronbach's alpha is to 1.0, the better the scale was constructed. The overall reliability of our survey was 0.755 (moderately high, based on a 0.7 cut-off).[24] The survey appeared to be a reliable tool for consistently measuring changes in ability, confidence, and knowledge based on the asthma education intervention.

From all the participants we collected demographic data, including age, sex, ethnicity, income, education, and previous experience with asthma. We stratified the age data according to the United States' census categories. The race/ethnicity categories were based on the State of California's census categories. Education was categorized by rank-ordered strata (grade school, high school diploma/general educational development test, some college or vocational training, college degree, and graduate degree). Annual income was divided into 2 categories: $25,000/year or less, and $25,001/year or more. Previous experience with asthma was assessed with 4 yes/no questions regarding personal and/or family asthma history.

Survey Procedure

Participants anonymously completed the demographic data sheet and pre-intervention survey before the educational intervention, and the post-intervention survey immediately after the intervention. Participants placed the

Table 1. Demographics of Participants

	Percent*
Age	
20–30	20
31–40	36
41–50	25
51–60	12
> 61	6
Race/Ethnicity	
African American	2
Asian	6
Hispanic	29
Native American	3
Other	2
White	59
Education	
Grade school	14
High school	16
Some college	42
College degree	20
Graduate degree	7
Income	
≤ $25,000	52
≥ 25,001	48

* n = 71. Totals do not necessarily equal 100%, because of rounding.

completed surveys in a designated box at the asthma education site.

Statistical Analysis

We performed descriptive and inferential statistical analyses with statistics software (SPSS Graduate Pack 12.0, SPSS, Chicago, Illinois).

Results

Participant Demographics

There were 71 participants (Table 1), of whom 99% were female. Fifty-six percent were 20–40 years old, and the remainder were ≥ 41 years old. The most common racial/ethnic group among participants was white (59%), followed by Hispanic (29%), Asian (6%), Native American (3%), African American (2%) and other (1%). Nearly 70% reported at least some college education, and 30% had a high school education or less. Fifty-two percent reported an annual income of ≤ $25,000.

Fifty-seven percent of the respondents had an immediate family member who had been diagnosed with asthma by a doctor. Among the respondents and their immediate family members, 48% had seen a doctor for asthma treatment, 28% had been to an emergency department for asthma treatment, and 13% had been hospitalized overnight for asthma treatment.

Table 2. Asthma Knowledge Before and After Education Intervention

Survey Item	Item Response	Before Education Intervention	After Education Intervention	P
Air quality counts	T	63	69	.02
	F	6	0	
Child with asthma/cold is more likely to have an asthma attack	T	57	68	.01
	F	8	1	
Bronchodilator used to treat asthma attack	T	48	65	.02
	F	10	4	
Indoor air quality asthma triggers	T	70	69	.99
	F	0	0	
Early warning signs of asthma attack	T	63	67	.56
	F	2	1	
Importance of asthma-trigger-control plan	T	68	69	.99
	F	0	0	

Changes in Knowledge

Wilcoxon signed rank test found that correct responses on 3 of the 6 knowledge items increased significantly after the educational intervention (Table 2): knowledge about air quality counts, knowledge that a child with asthma who catches a cold is more likely to have an asthma attack, and knowledge about whether a bronchodilator is used to treat an asthma attack. Knowledge of the remaining 3 items (indoor-air asthma triggers, early warning signs of an asthma attack, and importance of an asthma trigger control plan) was high before the intervention and did not significantly increase after the intervention.

Changes in Attitudes and Intentions

Wilcoxon signed ranks test found significant post-intervention changes in the 4 attitude items (Table 3), including comfort with ability to identify a child who needs medical attention for asthma, familiarity with the components of an asthma trigger control plan, ability to determine the likelihood of having an asthmatic child in the childcare facility, and ability to care for a child with asthma.

The pre-intervention scores on the intentions items were high, and the post-intervention intentions scores were not significantly different. There were nonsignificant increases in the participants' confidence in telling a parent not to smoke in the presence of a child and in making changes in the childcare facility to reduce asthma triggers.

Table 3. Attitudes and Intentions About Asthma

	Mean Likert-Scale Score*		
	Before Education Intervention	After Education Intervention	*P*
Attitudinal Items			
Able to identify a child who needs medical attention for asthma	2.61	3.41	< .001
Familiar with components of asthma-trigger-control plan	1.59	3.16	< .001
Able to determine likelihood of having a child with asthma in the childcare facility	3.12	3.25	.02
Comfortable caring for a child with asthma	2.62	3.25	< .001
Intentional Items			
Tell a parent not to smoke in the presence of a child	3.35	3.50	.08
Make changes to reduce asthma triggers in childcare facility	3.31	3.46	.18

* The Likert-scale terms depended on the question. Examples: 1 = Not confident, 2 = Somewhat confident, 3 = Confident, 4 = Very confident. 1 = Not familiar, 2 = Somewhat familiar, 3 = Familiar, 4 = Very familiar.

Discussion

The mean responses to the first 3 knowledge items (air quality counts, whether a child with asthma/cold is more likely to have an asthma attack, and that bronchodilator is a treatment for asthma attack) significantly improved, but the mean scores on the other 3 knowledge items (indoor-air asthma triggers, early warning signs of asthma attack, and the importance of the asthma trigger control plan) did not significantly improve, because the participants' pre-intervention knowledge was nearly 100% accurate (see Table 2). This finding may be partially explained by the high percentage of participants (57%) who were familiar with asthma, either personally or through an immediate family member. Moreover, the relatively high asthma prevalence (range 8.9–15.9%)[25] among children in the greater San-Francisco-Bay area may partly explain the respondents' relatively high familiarity with asthma.

The scores on the 4 attitude items significantly increased after the intervention. A central component of asthma management is a sense of control over factors that contribute to asthma severity, including recognizing early symptoms of an asthma attack, assisting a child to use asthma medication, reducing asthma triggers, and having an asthma trigger control plan.[12] Our educational intervention focused on these key factors and may have contributed to the participants' increased comfort with asthma management topics. Because changes in attitudes may lead to changes in actions, this finding suggests that childcare workers might modify the childcare environment to improve asthma management, given the support of authority figures such as parents and daycare owners.

Other significant changes included increased comfort with identifying a child with asthma and providing asthma care. An increased awareness of the possibility of caring for asthmatic children may make childcare workers more attuned to asthma signs and symptoms and may improve their ability to spot an at-risk child. Because asthma is the most frequently reported chronic disease in children, childcare workers who are more aware of the prevalence of asthma may be more observant of its symptoms in children under their care.

The intervention significantly increased the participants' familiarity with the components of an asthma trigger control plan. Previous research found that greater familiarity with asthma-trigger-control plans improved asthma management in a school-based asthma program,[23,26] and in a program that targeted parents' asthma knowledge,[27,28] by imparting knowledge about reducing asthma triggers.

Although the 4 attitude scores significantly improved, the 2 intentions scores did not significantly improve, because the pre-intervention scores were high. The participants reported a high baseline level of intention to manage asthma-related indoor air quality factors, including telling parents to limit smoking and reducing asthma triggers in the childcare facility. A high intention level implies a willingness to implement knowledge and attitude change in practice. Future asthma education could capitalize on this high intention by introducing more advanced content, to ensure the comprehensive implementation of asthma-management knowledge, attitudes, and intentions in the childcare environment.

Limitations

Our findings may be limited by selection and measurement bias. Participants were self-selected from mailings to all childcare workers in Sonoma County, so volunteer bias may have occurred. Because we used convenience sampling, our findings may only reflect the knowledge, attitudes, and intentions of the participants, rather than those of the general population of childcare workers.

Fifty-seven percent of the participants had previous experience with asthma, and the findings might be different with childcare workers who have less previous experience with asthma.

We do not know whether the intervention will make a difference in patient outcomes in children with asthma under the participants' care. This aspect of validity should

be tested with future interventions with different populations of childcare workers and follow-up with participants.

It is recommended that to have adequate power, the sample size per variable should have approximately 10 cases to be reasonably stable.[29] The present study had fewer than 10 cases per variable, so a larger sample size might have revealed more significant results.

Conclusions

Further assessment of asthma education interventions among childcare workers, particularly of the influence of childcare workers on asthma medication adherence, should be conducted. Studies of asthma management should examine differences in knowledge and attitudes by race/ethnicity, socioeconomic status, and sex. In addition, care providers for racial and ethnic minority children should be targeted for future asthma education intervention, because minorities have disparately high rates of asthma.[30,31] Though the present intervention was privately developed, our survey instrument could be translated into other languages and easily adapted to collect appropriate demographic information.

Childcare workers may play an important role in promoting improved air quality in their facilities and communicating asthma control strategies to parents and families. The present study suggests that asthma education can improve childcare workers' knowledge about asthma control strategies and attitudes toward asthma interventions in their facilities, and their high baseline intentions may indicate willingness to implement knowledge and attitude improvement in daily asthma management. Additional asthma management education, tailored to participant knowledge level, could contribute to an informed childcare workforce providing appropriate care for young children with asthma.

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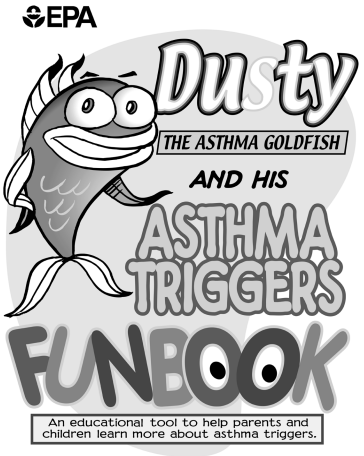

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