



Caregiver and pediatric provider perspectives on symptom-based inhaled corticosteroid therapy in asthma

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ABSTRACT

Objectives: Guidelines recommend that healthcare providers adjust the dose of inhaled corticosteroids (ICS) in asthma patients based on the degree of symptom severity and control. Symptom-based, intermittent ICS therapy (use of ICS together with short acting bronchodilators- symptom-based adjustment: SBA) has been demonstrated to be comparable to guideline-based management by providers in controlled clinical trials. We sought input from African American caregivers and pediatricians on the acceptability and barriers for this alternative management strategy.

Methods: Focus group interviews of caregivers and individual interviews with community providers of African-American children ages 6–17 years with mild-moderate persistent asthma were conducted by trained facilitators to assess perceptions of how asthma affects children and their caregivers, and of SBA as a management strategy. Interview data were transcribed and analyzed using inductive thematic based coding.

Results: Twenty-six parents participated in six focus groups. Fourteen pediatricians were interviewed. Caregivers reported facing financial burden and difficulty with tracking medications. Caregivers and pediatricians were favorable about SBA, citing its potential for decreased use of medications and cost and similarity to actual care provided. Some caregivers voiced concern that SBA would not be as effective as daily ICS. Caregivers suggested that education on symptom recognition and close communication between physician and patient would facilitate the implementation of SBA.

Conclusions: SBA was generally viewed favorably by caregivers and providers of African American children. However, concerns regarding effectiveness of SBA were voiced by both caregivers and providers. Patient education and provider-patient communication is important in implementing this alternative asthma management strategy.

1. Background

African American children with asthma have more symptoms and higher rates of exacerbation, healthcare utilization and mortality than white children with asthma, even after adjusting for factors such as income, education, and asthma severity [1,2]. African American children also report lower quality of life compared to their white peers. One commonly cited explanation for this disparity is lack of adherence to clinical visits and daily use of controller medication [3,4].

Symptom-based adjustment (SBA) is a strategy whereby inhaled corticosteroids (ICS) are administered concurrently with short acting

bronchodilators when symptoms occur. SBA allows the patient or caregiver to adjust their ICS dose use without requiring clinic visits, in contrast to the current guideline-based strategy in which the patient takes fixed daily doses of ICS with dose adjustment during provider clinical visits. Several prior studies have demonstrated that symptom guided, intermittent inhaled corticosteroid therapy is as effective as daily use of ICS in controlling mild to moderate persistent asthma and preventing exacerbations [5–7]. Therefore, SBA could be a simpler, patient-centered, alternative strategy with adjustment of the ICS dose based on patients' asthma symptoms rather than providers' orders, especially in those African American patients who have difficulty

Abbreviations: ICS, inhaled corticosteroids; SBA, symptom based adjustment; LTRA, leukotriene receptor antagonist; LABA, long acting beta agonist

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adhering to clinical visits and daily use of controller medications. However, SBA is not commonly used by providers in current routine practice [8].

We conducted a focus group study of African American caregivers and structured interviews with pediatric primary care providers to better understand their perceptions SBA, and identify what they would consider as barriers and facilitators to implementation in the community.

2. Methods

2.1. Study design and population

2.1.1. Caregivers

Our target population of caregivers of African-American children with asthma was recruited using flyers posted in public places in communities including health fairs, bulletin boards, and community pediatricians' offices. Six focus groups included a total of twenty-six African-American caregivers of children and adolescents with asthma, in groups of two to five caregivers. We included caregivers of African-American children ages 6–17 years with asthma who met the criteria of 1) self-reported, physician-diagnosed asthma, 2) prescribed treatment with low dose ICS, or leukotriene receptor antagonist [LTRA], or low-dose ICS plus LTRA, 3) symptoms less than 5 times a week per parent report, and 4) no severe asthma (not on high dose ICS or combination therapy or history of ICU admission). We determined these criteria based on a previous study in which SBA was found effective in mild-moderate persistent asthma [7].

Focus group interviews were facilitated by two external facilitators with special training in focus group methods. The facilitators' roles were to conduct the focus group and analyze the qualitative data. They had no role in clinical care, nor in conducting any aspect of research besides the focus group. The six group interviews, which ranged from 44 to 90 minutes in length, were held at community locations (public park recreation center, civic center, privately owned community center, and a church) to increase ease of participation. Caregivers were asked to complete a confidential (i.e., de-identified) questionnaire soliciting basic socio-demographic and clinical information. In group interviews, caregivers were initially asked a series of questions from an interview guide that focused on the impact of asthma on their children. Group members were then introduced to the concept of symptom-based adjustment strategy for treatment of asthma, and were asked a set of open-ended questions to determine their initial impressions and concerns regarding this strategy (Table 1).

2.1.2. Primary care pediatric providers

Primary care pediatric providers of African-American children and adolescents with asthma in the City of St. Louis were invited to participate. Face-to-face interviews were conducted with a sample of 14 primary care pediatric providers.

Pediatric providers were interviewed individually by the researcher (pulmonary physician: (K.S.)). The researcher was trained in qualitative interview methods and used a guide constructed for the interview

Table 1
Questions for caregivers.

1) How does asthma bother you and your child?
2) What is the most important goal for asthma care for you and your child?
3) How do you usually manage your child's asthma every day?
4) Do you do things differently when the child's asthma is doing well, and when the symptoms area worse?
5) (After describing what SBA is and how to do it) What comes to your mind first about the approach called "symptom based adjustment" for children?
6) What would stop you from trying the new symptom-based adjustment approach?
7) Are there any problems you can think of when doing the symptom-based adjustment?

(Table 2). Interview guide items addressed first the providers' perceived barriers to asthma management in their practice. Then, the concept of SBA was introduced, and the providers were asked about their perspectives of SBA and perceived barriers to its use.

This study was approved by the Institutional Review Board at Washington University in St. Louis.

2.2. Analysis

Focus groups and provider interviews were conducted until all points in the respective interview guides had been saturated and no new concepts were identified by interviewees. Because the purpose of focus groups is to allow some members to stimulate the thinking of others and thus generate unanticipated content, flexibility was allowed

Table 2
Questions for providers.

1) What do you think about the current asthma guidelines?
• Do you think it is working for you?
• What is the advantage of the current asthma guidelines?
• What are the problems of the current asthma guidelines?
• Do you think it is easy for patients to follow?
• Do you think it is difficult for patients to follow?
• What change would you like to see?
2) (After describing what SBA is and how to do it) Can you describe what first comes to mind about the symptom based approach to asthma management for children in your practice with mild to moderate asthma?
• Do you see any barriers for implementing SBA?
• Do you have any suggestions for implementation?

in interviews. All focus groups and provider interviews were audio-taped and transcribed verbatim by a professional transcriptionist experienced in transcribing group interviews. Two external facilitators who conducted the focus group sessions also conducted the qualitative analysis.

Dedoose, a cross-platform software, was used for qualitative data management and analysis. The qualitative analysts employed a mixed content analysis approach [9] that included: 1) development of a codebook and 2) identification of themes. First, preliminary codes were developed based on questions from the interview guide. One transcript was selected for double-coding, ensuring these preliminary codes adequately captured patterns that developed across the focus groups. This led to the development of an initial codebook. Upon agreement of the codebook, the remaining transcripts were double-coded for themes. Throughout the process, the analysts met regularly to discuss coded data and address coding disagreements to facilitate the identification of salient themes. Mixed content analysis, characterized by the use of inductive and deductive reasoning, is an appropriate method for analyzing qualitative data derived from semi-structured interviews. Its flexible structure enables data analysis according to an existing framework while at the same time allowing researchers to discern common threads that may have emerged outside the interview guide [9]. An identical strategy was employed to analyze physician interviews. Emergent themes from caregiver focus groups and individual provider interviews were compared to identify concordant and discordant perspectives of SBA.

3. Results

3.1. Participant demographics

Caregiver and children's sociodemographic characteristics are displayed in Table 3 (n = 26). All participants were African American, and cared for children with mild to moderate asthma. 42% were fully employed, and 54% had an annual household income of less than \$20,000. Sociodemographic characteristics of providers (n = 14) are displayed in

Table 3
Characteristics of caregivers and their children.

Caregiver Demographics (n = 26)	
Mean age in years at visit (SD)*	37.32 (8.6)
AA race %	100
Married %	35
Caregiver Employment Status (%)	
Full employment	42
Part time employment	19
Unemployed	31
Caregiver Annual Income (%)	
Less than \$20,000	54
\$20,000–35,000	19
\$35,000–50,000	15
\$50,000–70,000	4
\$70,000–100,000	4
Level of Education (%)	
Below high school	8
Completed high school	31
Some high school	35
Characteristics of children (n = 26)	
Parent reported severity %	
Mild	35
Moderate	46
Severe	12
Mean number of ED or urgent care visits in the past year (SD)	1.46 (1.84)
Frequency of controller medication use %	
Every day	46
Only when asthma is bad	42
Frequency of rescue medications in the past 4 weeks %	
More than once daily	15
Few times a week	46
Few times a month	15
None in the past 4 weeks	24

Abbreviations; AA: African American, SD: standard deviation.
ED: emergency department.

Table 4. In the majority of providers, their patient population was more than 50% African American.

3.2. Major themes

Three themes emerged from the caregiver focus groups: 1) *effects of asthma on caregivers and children*; 2) *challenges related to treating asthma*; and 3) *perceptions of Symptom Based Adjustment Treatment*. Pediatric provider interviews findings are presented in comparison to these themes.

3.2.1. Effects of asthma on caregivers and children

Caregivers consistently spoke of the financial burdens associated with treating their children's asthma. Additionally, caregivers discussed the resulting diminished quality of life that they and their children experienced.

Table 4
Provider characteristics.

Providers	n = 14
Mean number of years in practice	24 ± 7
Solo practice structure	35%
Number of patients seen daily	
15–30	93%
31–50	7%
More than 50% AA patients in practice	71%
Approximate number of patients with asthma in practice	
1–100	7%
101–300	7%
301–500	43%
501–1000	21%
More than 1000	21%

Abbreviations; AA: African American.

3.2.1.1. Financial burden. Caregiver perspective. Nearly all caregivers mentioned the costs associated with follow-up visits to the primary care physicians' offices and the subsequent medications prescribed.

“We actually took [my son] in two, three times to the doctor's office, so that would be \$30.00 each time. Then to go get the medicine, that's another thing. It costs.”

Additionally, almost all employed caregivers noted missed days of work and lost income as a result of their children's asthma. One caregiver explained quitting her job because her child's asthma:

“So it's either, no appointments, and you know, keep your job, or, you go to the appointments, you lose your job, that's it, bye.”

3.2.1.2. Diminished quality of life. Nearly all caregivers mentioned the diminished quality of life that they and their children experienced. They specifically talked about their children missing school days and having limited participation in sports and social activities. Caregivers discussed the stress of watching their children go through the effects of asthma and the hyper-vigilance that the asthma has produced.

“I still like to let her do all the activities, but I'm constantly reminding the teacher every day ‘Now you know today I looked at the weather, it's gonna be a little hot. If you let all the other kids go, don't take my baby out.’”

3.2.2. Challenges in treating asthma

Caregivers and providers consistently brought up challenges in treating asthma, such as managing multiple medications and confusion regarding treatment plans.

3.2.2.1. Managing medication. Several caregivers expressed frustration in overseeing their child's medications. They reported that this task was especially difficult when children required numerous medications in a variety of contexts to treat symptoms.

“I need one for the daycare, and one for the school, and one for home. It's hard.”

3.2.2.2. Adherence to varied treatment plans. Caregiver perspective. Some caregivers said that treatment was ineffective despite understanding and adhering to prescribed treatment. They overwhelmingly shared that shifting treatment plans (step-up/step-down) caused them to question physicians' orders. For example, one caregiver stated:

“I don't feel like it works the way they explained. I'm doing everything you told me to do. You're saying that they're still wheezing. To me, it's not working.”

Provider perspective. While some caregivers felt that treatment was ineffective despite adherence, most providers reported the belief that caregivers were non-adherent with asthma treatment plans. Several providers attributed this to caregivers' misunderstanding of the role of each medication, as highlighted by one provider who stated, “It's not uncommon for a parent to confuse an inhaled corticosteroid with a rescue medicine and reverse the process of what they're using them for.” Additionally, non-adherence with follow-up visits represented missed opportunities for continuity of care and dose adjustment.

“They're not coming back in, even though you might schedule them to come back in three months. Being able to step up and step down is not always possible.”

3.2.3. Perceptions of symptom based adjustment

Three themes emerged from the caregivers regarding SBA: (1) SBA alignment with caregiver goal for decreased medication frequency and

dose (2) concerns about treatment effectiveness, and (3) barriers and facilitators to implementation of SBA into practice and to treatment adherence. Findings from the pediatric provider interviews are also presented regarding these themes.

3.2.3.1. Intermittent use of ICS in alignment with their goals. Caregiver perspective. Several caregivers spoke favorably about the SBA strategy, which they said was consistent with their goals of less medication and decreased dependence on preventive medications. Many reported that they do not use ICS daily as recommended by their provider, but instead administer ICS intermittently as needed.

“We still only use it as needed, ‘cause I don’t want to give it to you if you don’t need it.”

Providers’ perspective. Providers’ input was congruent with caregivers’ sentiments, saying that many caregivers already administer ICS intermittently despite instructions to administer them daily. Providers mentioned that caregivers seem uncomfortable with giving their children daily steroids. A provider stated:

“[SBA is] probably what we should be doing and it’s probably what we are doing, but we don’t realize we’re doing it. The patients are already doing this whether we realize they’re doing it or not.”

Providers also mentioned that SBA may be viewed favorably by families because it is less expensive, as a result of eliminating the need for a daily medication.

3.2.3.2. Better recognition of symptoms by SBA. Caregiver perspective. Caregivers felt that SBA may allow for better recognition of symptoms. One mother stated:

“It would probably make her more compliant if she only had to use the orange inhaler when she uses the red inhaler. Because when you’re feeling bad you’re more likely to try to do something about it.”

Provider perspective. Providers agreed with caregivers on this point. One provider stated:

“[SBA] would be a good idea because the patients would have a little bit more hands-on control of making adjustments and wouldn’t be so dependent on calling me to get medication, wouldn’t be so dependent on coming back to the office to get an assessment.”

3.2.3.3. Concerns about treatment effectiveness with SBA. Caregivers’ perspective. While most caregivers viewed SBA as an effective treatment strategy, a few reported concerns about effectiveness. Those caregivers who adhered to current asthma guidelines questioned whether SBA would be as effective as daily use of ICS. Safety and uncertainty of effectiveness seemed to be of great concern, as they voiced apprehension about switching from guideline-recommended daily treatment to SBA:

“You don’t want to put them at risk and change it, ‘cause that’s a huge change, to go from every day, preventative, to whenever you need ... [I’m] not sitting comfortably with that part.”

Provider perspective. Providers shared caregivers’ concerns about effectiveness. Some were concerned about outcomes for patients who received improper amounts of ICS between doses of the rescue medication.

“... [SBA], it’s almost exactly what we’re telling people not to do right now and so I guess the first question is would it work since a lot of caregivers are doing that already?”

3.2.3.4. Barriers to implementation of SBA. Both caregivers and physicians mentioned the increased responsibility for children to

manage their own medication.

Caregivers. Some caregivers, across focus groups, reported that they felt that managing multiple inhalers could be a barrier for the children.

“Sometimes they have to go to gym, so it’s easier to push one in your pocket versus – a little pocket that can’t fit more than one, so that would be something to think about.”

Some caregivers stated that SBA may not work for their child because of varying interpretations of the “no-drug” policy among schools. A few caregivers reported that their schools prohibit children from carrying their medication, and therefore, school nurses would be responsible for storing and administering all medication.

“We have to take ours to the nurse at his school. They don’t allow their kids to take their medicine.”

Providers. Providers expressed mixed views regarding SBA and school policies. Some providers reported anticipating no issues with supplying two inhalers, because they believed school nurses would be able to follow SBA protocol with fidelity. Others said that they believed that nurses would have difficulty adhering to the new treatment strategy, because it will primarily be the caregiver’s responsibility to inform school nurses about changes to the treatment regimen.

Providers also voiced their concerns about patients’ ability to follow SBA strategy:

“They’re gonna get even more confused as to what’s a controller and what’s a rescue medication. When they’re really in trouble, they may grab the controller instead of the rescue.”

3.2.3.5. Facilitators for implementation for SBA. Caregivers. Caregivers mentioned potential tools for learning, including visual aids, web-based classes, and tutorials. They discussed in great detail the impact of good communication and positive parent-physician relationships for adhering to the SBA protocol. Several caregivers reported that having access to their physician would be beneficial, particularly those who reported adherence with current guidelines, because they were concerned that SBA may be ineffective.

“... Just [having] the assurance of me being able to reach you all. Just having the assurance of that I can get to somebody if [SBA] may not work or it’s not working fast enough.”

Providers. Providers also mentioned that extensive education on symptom recognition and treatment strategy would significantly increase implementation. They commented on the need for extended family members to be knowledgeable about SBA, especially families with non-traditional living arrangements. One provider stated the importance of educating all caregivers who share physical custody:

“The reason to talk to both parents is because ... if mom has [information on SBA treatment protocol] she may not share with dad. The medicine might not even go to the child when he’s at dad’s house.”

4. Discussion

The primary objective of the present study was to evaluate the perceptions of symptom-based adjustment treatment strategy of caregivers and health care providers of African-American children with asthma. Since African American patients have difficulty adhering to clinical visits and daily use of controller medications [3,4], we thought SBA could be a simple, patient-centered, alternative treatment strategy in this population, as SBA does not require full adherence to daily ICS therapy and frequent clinic visits to their providers to adjust the dose of ICS. Initial discussion centered on the effect of treatment of asthma on caregivers and children, such as financial burden and decreased quality of life, and the challenges related to treatment of asthma, such as

difficulty managing multiple medications. Following an introduction to the concept of SBA, many caregiver and pediatric providers viewed the concept of intermittent therapy with decreased corticosteroid dosage favorably, while others voiced skepticism about the effectiveness and ease of implementation of this approach.

With respect to the effect of asthma on caregivers and children, most caregivers discussed the financial burden associated with frequent visits with providers and the cost of missed work days, a concern recognized in this population [10–12]. As observed in other qualitative studies, caregivers expressed frustration with the challenge of remembering to help their child administer asthma medications regularly [11–13].

Based on these and other findings, we see that caregivers of children with asthma are faced with a number of challenges associated with a regimen requiring daily controller medications, including financial burden and managing multiple medications. In our focus group interviews, the concept of SBA for mild to moderate persistent asthma was presented to caregivers and healthcare providers as an alternative treatment strategy. Overall, caregivers and pediatric healthcare providers viewed SBA favorably. They agreed that SBA is a patient-centered strategy that would empower caregivers to make adjustments, better recognize early symptoms of asthma, improve adherence and possibly reduce costs. The two groups also agreed that many caregivers already administer ICS intermittently to their children to minimize steroid doses despite healthcare providers' recommendation for daily ICS use. They likewise agreed that education for healthcare providers and caregivers would be essential for the successful implementation of SBA, because this treatment strategy would deviate from current recommendations for guideline based daily therapy.

Although perceptions of SBA were favorable, a number of concerns remained. Caregivers expressed apprehension about an abrupt transition to intermittent dosing and the potential for loss of control of previously well-controlled asthma. Both caregivers and health care providers presented concerns about feasibility, whereby children would require two inhalers on hand at all times, especially in households with numerous caregivers and in schools. A number of suggestions were voiced regarding facilitators of implementation, including extensive education and for both healthcare providers and patients, which would require resources outside of the office visit setting.

To our knowledge, this is the first qualitative study describing the perspectives of SBA by caregivers and providers of children with asthma. Both caregivers and providers viewed SBA as a strategy that aligns with the caregiver's desire to decrease cumulative steroid doses, minimize side effects, and reduce cost of treatment. Caregivers and providers also accepted SBA favorably, since children may already be on intermittent treatment similar to SBA because they are not taking daily controller medications. Therefore, SBA may be an acceptable alternative regimen and may be an option to help mitigate the difficulty of treating asthma based on current guidelines in this urban minority population.

Limitations of this study stem primarily from its focus on one urban African-American sample, which may limit generalizability, although efficacy for SBA had been studied in target populations including whites and African Americans [5–7]. Further study is warranted to address perceptions of symptom based adjustment in other groups. Clinical trials evaluating the effectiveness of symptom-based adjustment in this population are underway. Our caregiver and provider perceptions may inform how SBA can be more effectively implemented, but varying perspectives should be solicited. In addition, there is potential for bias

in this type of qualitative study because facilitators and the interviewer had prior knowledge of the alternative treatment. However, they received training for facilitated discussion by an expert in focus group methods to minimize the potential for bias. Lastly, our goal was to assess perceptions of caregivers and providers regarding SBA. Previous studies have shown SBA to be effective in mild to moderate asthma [5–7]. However, further investigation is needed to determine the effectiveness of SBA in this population, because it was not within the scope of this work to assess the appropriateness of this alternative treatment strategy.

5. Conclusion

SBA is a patient-centered approach that may be an acceptable alternative for treatment of persistent asthma in urban African-American children. Extensive patient and provider education and good parent-physician relationships will play an important role in the successful community implementation of SBA. Further studies are warranted to evaluate the efficacy of this strategy in other high risk minority populations.

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References

- [1] M. McDaniel, C. Paxson, J. Waldfogel, Racial disparities in childhood asthma in the United States: evidence from the National Health Interview Survey, 1997 to 2003, *Pediatrics* 117 (5) (2006) e868–e877.
- [2] J. Miller, The effects of race/ethnicity and income on Early childhood asthma prevalence and health care use, *Am J of Public Health*, 2000, pp. 428–430.
- [3] M.P. Celano, et al., Treatment adherence among low-income, African American children with persistent asthma, *J. Asthma* 47 (3) (2010) 317–322.
- [4] J. Finkelstein, et al., Comparing asthma care for Medicaid and non-Medicaid children in a health maintenance organization, *Arch. Pediatr. Adolesc. Med.* 154 (6) (2000) 563–568.
- [5] H.A. Boushey, et al., Daily versus as-needed corticosteroids for mild persistent asthma, *N. Engl. J. Med.* 352 (15) (2005) 1519–1528.
- [6] F.D. Martinez, et al., Use of beclomethasone dipropionate as rescue treatment for children with mild persistent asthma (TREXA): a randomised, double-blind, placebo-controlled trial, *Lancet* 377 (9766) (2011) 650–657.
- [7] W.J. Calhoun, B.T. Ameredes, T.S. King, et al., Comparison of physician-, biomarker-, and symptom-based adjustment strategies for adjustment of inhaled corticosteroid therapy in adults with asthma: the BASALT randomized controlled trial, *J. Am. Med. Assoc.* 308 (10) (2012) 987–997.
- [8] A.C. Wu, L. Li, V. Fung, et al., Mismatching among guidelines, providers, and parents on controller medication use in children with asthma, *J Allergy Clin Immunol Pract* 4 (5) (2016) 910–916.
- [9] B.L. Berg, H. Lune, *Qualitative Research Methods for the Social Sciences*, fifth ed., Pearson, Boston (MA), 2004.
- [10] M.R. Patel, R.W. Brown, N.M. Clark, Perceived parent financial burden and asthma outcomes in low-income, urban children, *J. Urban Health* 90 (2) (2013) 329–342.
- [11] N. Laster, et al., Barriers to asthma management among urban families: caregiver and child perspectives, *J. Asthma* 46 (7) (2009) 731–739.
- [12] Jane M. Garbutt, DiTalliana Patterson, Sarah Gehlert, Robert C. Strunk, Insights from parents can guide asthma care for urban, minority children, *J Allergy Clin Immunol Pract* 5 (2) (2017) 519–520.
- [13] K. Peterson-Sweeney, et al., Parental perceptions of their child's asthma: management and medication use, *J. Pediatr. Health Care* 17 (3) (2003) 118–125.