

## The Use of the Asthma Blues<sup>®</sup> Educational Program and Device Teaching to Improve Asthma Knowledge and Self-Management Skills

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### Abstract

**Background:** Empowering patients with asthma knowledge and self-management skills is critical to their achievement of asthma control. The purpose of this study was to determine if asthma knowledge could be increased using the Asthma Blues<sup>®</sup> Educational Program and asthma self-management skills could be improved by the teaching of proper use of a nebulizer machine, peak flow meter, and spacer with metered-dose inhaler (MDI). **Method:** Ten patients > 18 years of age admitted to the hospital with a documented physician diagnosis of asthma were recruited by a respiratory therapist to participate in this pilot study. During their hospitalization, patients received one-on-one teaching by a respiratory therapist on both the Asthma Blues<sup>®</sup> educational program and training on how to use a nebulizer machine, peak flow meter, and spacer with metered-dose inhaler (MDI). The Asthma Blues<sup>®</sup> educational program is an innovative and powerful way to improve the quality and efficiency of asthma education. Patients were asked to complete the Asthma Blues<sup>®</sup> educational program and to demonstrate proper nebulizer machine, peak flow meter, and spacer with metered-dose inhaler (MDI) technique pre- and post-intervention. **Results:** Asthma knowledge, assessed using the 15-item Asthma Blues Test, improved by 58% after receiving the Asthma Blues<sup>®</sup> educational program. All participants scored 100% on the nebulizer machine, peak flow meter, and spacer with metered-dose inhaler checklists after receiving training on proper use of each of these devices. The mean score improved from 44.5% pre-intervention assessment of asthma knowledge to 70.8% post-intervention. Patients scored 100% in device(s) knowledge and use following the instructions. **Conclusions:** Respiratory therapist delivery of asthma education using the Asthma Blues<sup>®</sup> educational program and asthma self-management training by demonstration of proper nebulizer machine, peak flow meter, and spacer with metered-dose inhaler (MDI) use was well received by patients and achieved improvements in both asthma knowledge and self-management skills.

**Key Words:** asthma, adult asthma, asthma education, asthma knowledge, asthma self-management, peak flow meter

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## Introduction

Asthma self-management, including use of controller medications and routine monitoring of symptoms, has proven helpful in minimizing symptoms of asthma as well as lessening the severity of asthma attacks when they do occur.<sup>1</sup> Studies show that many patients have a high frequency of emergency department visits due to poor asthma knowledge and self-management skills.<sup>2,3</sup> Hence, patients who are admitted to the hospital for asthma exacerbations represent a key opportunity for respiratory therapists to provide asthma education and self-management training. A previous randomized controlled trial was done to test whether an intensive asthma intervention program led by specially trained nurses could prevent readmissions of adult patients who were noted to be high users of health care. The multi-component intervention included asthma education, a written asthma action plan, social support, and telephone follow up calls after discharge. The combination of all of these components produced a significant decrease in asthma readmissions as well as total hospitalizations compared to patients receiving usual care.<sup>4</sup>

In 2005, Asthma Blues<sup>®</sup>, an interactive and easy-to-use asthma educational tool, was released.<sup>5</sup> The musical CD consists of seven songs and an educational booklet that delivers clinical concepts key to successful asthma self-management. The Asthma Blues<sup>®</sup> educational program reinforces and expands key messages from the 2008 Guidelines Implementation Panel (GIP) Report.<sup>5</sup> The purpose of this study was to determine if respiratory therapist delivery of the Asthma Blues<sup>®</sup> educational program, as well as training in proper use of a nebulizer machine, peak flow meter, and spacer with metered-dose inhaler (MDI), could improve asthma knowledge and self-management skills, respectively.

## Methods

This study was approved by the Rush University Medical Center Institutional Review Board. Patients > 18 years of age admitted to the hospital with asthma listed as one of their diagnoses were approached by a treating clinician to participate in the study. If the patient expressed interest and gave permission to be contacted by study staff, then the treating clinician gave the patient's contact information to the principal investigator, a respiratory therapist. Exclusion criteria included candidate refusal to participate in the study.

### *Study Design and Intervention*

After obtaining written informed consent, patients were asked to complete a demographics questionnaire and the Asthma Blues<sup>®</sup> pre-test, as well as demonstrate proper use of

a nebulizer machine, peak flow meter, and spacer with MDI. Following completion of the questionnaires, patients listened to five out of seven songs on the Asthma Blues<sup>®</sup> CD and read through educational modules accompanying these songs. The respiratory therapist then demonstrated proper use of a nebulizer machine, peak flow meter, and spacer. At the conclusion of the visit, patients were asked to complete the Asthma Blues<sup>®</sup> post-test and to demonstrate proper nebulizer machine, peak flow meter, and spacer technique. Variance in instrument administration and teaching of procedures was minimized by: 1) having only one respiratory therapist for all study participants; 2) the respiratory therapist strictly adhering to the Asthma Blues<sup>®</sup> Educational Self-Study Guide;<sup>5</sup> and 3) the respiratory therapist strictly adhering to the American College of Chest Physicians Patient Education Guide for teaching and evaluating proper use of a nebulizer machine, peak flow meter, and spacer with MDI.<sup>6,7</sup>

### *Measurement Tools*

In this study, we used the following instruments to assess the patient's knowledge of asthma and asthma self-management skills: Asthma Blues<sup>®</sup> Educational Program,<sup>5</sup> Asthma Blues<sup>®</sup> Pre-Test and Post-Test,<sup>5</sup> and Device Knowledge Questionnaires.<sup>6,7</sup>

### ***Asthma Blues<sup>®</sup> Educational Program and Asthma Blues<sup>®</sup> Pre-Test and Post-Test***

Asthma Blues<sup>®</sup> communicates the goals of the National Heart, Lung and Blood Institute's Expert Panel Report 3 through the use of songs about asthma and delivers five of six messages from the 2008 GIP report.<sup>5</sup> The Asthma Blues<sup>®</sup> educational program pre-test and post-test are the same instrument. It is referred to as the pre-test when administered before the participant completes the Asthma Blues<sup>®</sup> educational program and the post-test after program completion. It consists of 15 items. Some of the items require multiple fill-in-the-blank answers, for a total of 23 possible correct answers.<sup>5</sup>

### *Device Knowledge Questionnaire*

The Device Knowledge Questionnaire consists of three individual competency checklists to test patients' knowledge on the use of a nebulizer machine (8 steps), a peak flow meter (7 steps), and a spacer with a MDI medication (6 steps).<sup>6,7</sup> To receive credit for completing each step correctly, the participant had to perform the step correctly and complete each step in the proper order. A passing score equaled 100% (i.e. all items performed correctly and in the correct order).

**Table 1**  
*Demographics and Baseline Measurements*

	Treatment (n = 10)
Age in yrs, mean (range)	54 (27-77)
Gender, Female	7 (70%)
Race/Ethnicity	
American/Alaskan Indian	1 (10%)
Black/African American	5 (50%)
Hispanic/Latino	2 (20%)
White	2 (20%)
Highest Education Level	
< High school diploma	2 (20%)
High school graduate/GED	4 (40%)
Some college/college graduate	4 (40%)
Age of Asthma Diagnosis	
0-≤1 yrs	2 (20%)
≥1-18 yrs	3 (30%)
>18 yrs	5 (50%)
Daily Controller Medications (Prior to hospital admission)	
Oral corticosteroid	2 (20%)
Inhaled corticosteroid plus LABA	7 (70%)
Long-acting anticholinergic	2 (20%)

**Table 2**  
*Asthma Blues<sup>®</sup> Score Pre-Post Intervention*

	Treatment (n = 10)
Pre-intervention score (% items correct, mean, range)	45 (9-74)
Post-intervention score (% items correct, mean, range)	71 (43-91)
% Change (mean, range)	58 (4-65)

**Table 3**  
*Device Knowledge Assessment*

	Nebulizer Machine (n=10)	Peak Flow Meter (n=10)
Pre-intervention (% Passed)	50	20
Post-intervention (% Passed)	100	100
% Change	100	400

## Results

### *Participants*

Ten patients were recruited for the study. Table 1 represents the patients' demographic and baseline characteristics. The mean age was 54 years with a range of 27-77 years. Seventy percent were female. The most common racial/ethnic group among patients was Black/African American (50%), followed by Hispanic/Latino (20%), White (20%), and American/Alaskan Indian (10%). Forty percent reported at least some college and/or had graduated college, while 60% had a high school diploma/GED or less. Fifty percent of the patients reported having been diagnosed with asthma by a physician at > 18 years of age, 30% between the ages of 1-18 years, and 20% before their first birthday. Seventy percent of the patients were on an inhaled corticosteroid long-acting bronchodilator combination medicine, 20% were on oral corticosteroids, and 20% were on a long-acting anticholinergic medication prior to admission to the hospital.

### *Asthma Knowledge and Self-Management Assessments*

Table 2 represents Asthma Blues<sup>®</sup> pre-intervention and post-intervention asthma knowledge test scores.<sup>5</sup> The mean pre-test score was 45%, and the mean post-test score was 71%, with a 58% mean percent change. Table 3 represents summary asthma self-management scores pre- and post-

intervention, which were calculated based on the patients' demonstration of proper technique according to nebulizer machine, peak flow meter, and spacer with MDI competency checklists.<sup>6,7</sup> Mean percent improvement for nebulizer machine, peak flow meter, and spacer technique were 100%, 400%, and 67% respectively.

## Discussion

This is the first study to demonstrate improvement in asthma knowledge and self-management skills by a respiratory therapist: 1) in the inpatient setting; and 2) using music as the vehicle for delivery of the education. The respiratory therapist delivered the Asthma Blues<sup>®</sup> educational program<sup>5</sup> and one-on-one education on proper nebulizer machine, peak flow meter, and spacer technique during patients' hospitalization for asthma.<sup>6,7</sup> Asthma Blues<sup>®</sup> delivered key concepts to help persons to take control of their asthma through the use of music, songs, and accompanying educational modules.<sup>8</sup> Respiratory therapists caring for inpatients with asthma are uniquely positioned to deliver effective asthma self-management training on proper delivery of medications and self-monitoring of lung function.

This study had several limitations. The sample size (n=10) was small and there was no control group. Although the investigators were able to demonstrate improvements in both asthma knowledge and self-management skills, the study did not evaluate whether these improvements could be sustained over time. The promising results in this pilot study warrant a future, randomized clinical trial with a larger sample size and six month follow up period in order to evaluate for sus-

tained change. This study used asthma lyrics to increase asthma knowledge, laying the foundation for improving the patient's understanding of asthma, empowering him to become more active in disease management, and promoting the patient-clinician relationship.<sup>5</sup>

In summary, this pilot study demonstrated an improvement in asthma knowledge and asthma self-management skills by respiratory therapist delivery of the Asthma Blues<sup>®</sup> educational program and the teaching of proper device technique. Our educational intervention focused on the pathophysiology of asthma, function and appropriate use of medications, monitoring of asthma symptoms, assessment of asthma triggers, and proper use of medication delivery devices in order to empower patients to take better control of and manage their asthma.

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