

EVIDENCE BASED ASTHMA MANAGEMENT WITH SCHOOL-AGE CHILDREN

by

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Abstract

Asthma is a chronic disease that requires adequate management. According to the American Academy of Allergy, Asthma, & Immunology [AAAAI], 2015), 185 children had asthma-related deaths nationwide in 2007. In North Carolina public schools, asthma is the leading chronic health condition. Asthma is the primary disease process affecting children and the leading cause of school absenteeism in school-age children. A program evaluation of the asthma practices at a middle school and an elementary school in eastern North Carolina was conducted to ensure the program was following evidence-based practice. The evaluation found the program follows best practice, but the parents need to become more involved in their child's care to ensure adequate management.

Evidence-Based Asthma Management with School-age Children

The Centers for Disease Control (CDC, 2013) estimates 10.5 million children are diagnosed with asthma in their lifetimes, and approximately 7.1 million of those children continue to struggle with asthma. Children ages five to nine years old have the highest incidence when compared to other ages ranges from zero to 17, with a higher prevalence in boys (10%) compared to 7.1% of girls (CDC, 2013). Because children spend a large majority of their day in the school, it is vital that their asthma is well controlled. Children heavily rely on the knowledge of teachers and staff, including the school nurse, to effectively aid in managing their disease process.

Background and Significance

Asthma is a chronic disease that requires adequate management. Inadequate management can result in mortality. According to the American Academy of Allergy, Asthma, & Immunology [AAAAI], 2015), 185 children had asthma-related deaths nationwide in 2007. Daily, nine people in the United States die from asthma, resulting in more than 3,600 deaths per year (Asthma and Allergy Foundation of America [AAFA], 2015). According to the AAFA (2015) many asthma-related deaths could have been prevented with proper care and treatment. Asthma annually costs the United States healthcare system about \$3,300 per person in medical expenses, missed school, and early mortality (AAAAI, 2015).

In North Carolina public schools, asthma is the leading chronic health condition. Asthma is the primary disease process affecting children and the leading cause of school absenteeism in school-age children, with 48.6% of children having missed one or more days of school related to their asthma; in 2008, children age 5-17 years who had one or more asthma attacks in the previous 12 months missed 10.5 million days of school (CDC, 2013). Kozyrskyj, Kendall,

Jacoby, Sly, & Zubrick (2010) found children in lower socioeconomic classes have a higher incidence of developing persistent asthma. According to Clayborne (2005) 90 percent of counties in Eastern North Carolina fall below the poverty level. The World Health Organization (WHO) (2015) states asthma-related deaths occur mostly in low and lower-middle income socioeconomic classes.

Asthma is not curable, but rather a lifelong, chronic disease process that can be controlled with lifestyle adaptations and medications. Management of asthma requires an interdisciplinary team approach with the primary care physician, school nurse, parents, and students.

Review of the Literature

Several important components related to asthma management were found in the literature. Those components were parental involvement, student asthma self-management, nurses' role in asthma management, and education.

Parent Involvement

Parents need to be properly equipped with the knowledge of how asthma is diagnosed, presentation symptoms, common deterioration and how to properly handle each situation. Lawlor (2015) acknowledges that parents need to be able to understand the whole disease process to properly manage the child's medications. Engelke, Swanson, & Guttu (2015) recognized that support from the students family or peers help improved medication adherence and education. The U.S. Department of Health and Human Services (DHHS) National Institute of Health (NHI) (2014), the parents need to understand how to properly care, clean, and store their child's medical equipment, such as their space or inhaler if necessary.

Parents need to feel comfortable with their knowledge of asthma that they could discuss the situation with their child's schoolteachers and nurse. The NCAP and AANC Education and

Public Awareness Subcommittee (2011) seeks to inform parents of the necessity of using an asthma diary with their children to help utilize what can cause a child's exacerbation. The asthma diary allows the parent to document if the students' controller and rescue medications are providing adequate management of their symptoms.

A child's parents/caregivers are the best advocates for the proper management of their child's disease process. In-order for the parent to be involved, they need proper education in regards to how their child's disease should be managed during a school day. Parents serve as liaisons between the child's primary care physician and school nurse. They are in charge of filling out the students' health records and provide the final say for the students' ability to carry their own rescue medications on their person, signing off on their child's ability to carry medications as long as the child has a prescription for the rescue medication from their primary care provider. School nurses provide education to the parents about the importance of serving as a liaison for their child. Nurses reinforce the necessity of parents ensuring extra medications are provided to the school and all records, including the AAP, are up-to-date for the child. The U.S. DHHS NIH (2014) established that parents need to be educated regarding the importance of ensuring their child maintains adequate disease management through routine follow-up visits with their primary care provider. Nurses also need to provide education to the parents regarding the child's environment outside of school. Nurses educate parents, if they smoke, about the need to quit for their child's health (The Breathing Association, 2013). Toole (2013) determined that implementation of a bundle program for kids with asthma composed of school-based interventions helped to educate parents to provide the highest quality of care to their child. Education to the parents is necessary to facilitate communication to ensure the child's best interests, safety, and proper disease management is ensured throughout the school day.

Self-Management

A study conducted by Bartholomew et al. (2006) evaluated if a multilevel, school-based intervention did improve self-management of asthma, medical care, symptoms, functional status of children, and the school environment. The “Partners in School Asthma Management” Program was effective in improving the children’s self-management but not overall health.

Management of asthma is largely based on the child’s perception of their disease process. In a study about parental and children’s self-reported perceptions of their asthma responsibilities regarding managing the disease process, Ekim & Ferda Ocakci (2013) found that children believed they could better adequately control more factors in their disease than their parents believed the child could manage. As the children grow, they are able to take a more active role in managing their disease process.

Lawlor (2015) identified the importance of medication adherence for children to maintain control of their asthma. This includes education properly provided to the children and parents by the primary healthcare provider. Lawlor (2015) educated parents to be aware that the use of bronchodilators more than three times a week requires a preventative therapy intervention. The NCAP and AANC Education and Public Awareness Subcommittee (2011) recommends that controller medications should be taken daily to help control the frequency and severity of asthma symptoms with use of the rescue inhalers, such as oral steroids, during an exacerbation.

Ahmad and Grimes (2011) conducted a study examining morbidity with asthmatic children and found it is effectively decreased among schools with school-based asthma education programs. The study identified that medication adherence decreases occurrences in Emergency Room visits, absenteeism in schools, and asthma-related hospitalizations when the student was managed with interventions and medication. Putman-Casdorph & Badzek (2011) investigated

students' self-administration of medications with regards to the potential liability issues that could be accrued by the nurse. Putman-Casdorph & Badzek identified children that did not have access to their medications experienced more severe attacks, which had a higher potential to end fatally.

Nurses Role

School nurses take on a variety of roles, but to properly control students with asthma disease process, they need to provide case management to the higher acuity children to help the child reach their optimal health and academic achievements (Maughan, Bobo, Butler, Schantz, & Schoessler, 2015). Nurses care for a wide range of children with chronic conditions. Although many students only require sporadic visits to the school nurse, students with more fragile cases of asthma may require close case management by the nurse. Bonaiuto (2007) established a case management program maintained by the school nurses, which led to an improved attendance, behavior, academic performance, quality of life, and health compliance of the students. Moricca et al. (2012) identified that students with chronic debilitating conditions who require case management by the school nurse are more apt to require inhalers on an as needed basis throughout the school day. Nurses need to fully understand each student's individual case and ensure their medications are available in preparation for any exacerbation.

Assessment Process

Healthcare providers can assist children to better manage their asthma through of the screening process. The literature indicated that the important assessment factors include the physical assessment of the child, their risk factors, and potential triggers for an asthma exacerbation. Children need a thorough physical assessment to appropriately establish their baseline. In order for the children to understand different triggers that can exacerbate their

symptoms, they need to understand risk factors and how to screen for such triggers. Children need to be screened to distinguish between their asthma diagnoses.

Physical assessment. The North Carolina Asthma Program (NCAP) and the Asthma Alliance of North Carolina (AANC) Education and Public Awareness Subcommittee (2011) identify that screening tools, such as a peak flow meter, can help measure the students' ability to forcefully expel air out of their lungs. This value provides the clinician with a baseline to help their primary care provider establish an Asthma Action Plan (AAP), which is filed in the child's school medical record. The AAP is a guideline that assists guardians, parents, teachers, or nurses to appropriately respond and assist the child with an episode of wheezing or an exacerbation. It should outline how to properly respond to the child's asthma if an exacerbation should occur. The CDC recommendation reflects the NAEPP guideline that every person with asthma should receive an AAP (2013). According to a study, conducted by Simon & Akinbami (2016), examining national trends of asthma action plan recipients of children ages 2-17, children that had ever received an AAP increased from 41.7% to 50.7%. Moricca, et al. (2012) studied an asthma case management program within a school and found when a child's asthma was adequately managed, the child annually missed one less day of school.

Risk factors. There are many risk factors that can exacerbate the child's asthma. Toole (2013) reported there is a family inheritance of the disease process. The child's environmental situation predisposes the child to developing asthma. The child's school environment can affect the child's asthma. Measures should be taken to ensure the school environment is free of tobacco smoke with good indoor air quality, and the students are able to carry their medications. Living in inner-city poverty, being uninsured or Medicaid-enrolled, and being African American or Hispanic races are associated risk factors with children developing asthma. High parental stress,

maternal health status, behavioral and emotional issues of the child, exposure to tobacco smoke, poor child and parent self-efficacy, pessimistic asthma beliefs, and maternal health status are included as asthma morbidity risk factors. Risk factors, such as cultural and ethical beliefs, can also pose an affect on the way a child's treated with regards to their medication adherence. Domestic violence and urban crimes are indirectly related risk factors to the child's asthma morbidity because of stress and barriers to care (Toole, 2013).

Triggers. Triggers that can cause asthma exacerbations take many forms, with some being irritating substances while others are related to the environment such as changes in temperature or stress (North Carolina Department of Health and Human Services (NCDHHS, 2010). Children need to be educated about avoiding triggers to help them prevent exacerbations. (2010). They also need to have a general understanding regarding how to properly respond with medications when exposed to their triggers. If the child has exercise-induced asthma, the child should be pretreated before participating in gym class or when moving from cold environments to warm can trigger an asthma attack. Children need to understand their own individual triggers (North Carolina Asthma Program and the Asthma Alliance of North Carolina Education and Public Awareness Subcommittee, 2011). Helping a student develop an asthma symptom diary can help the student better pinpoint their triggers that can cause exacerbations (2011).

Education

Educating students. Students are educated to better understand the disease process that is the primary ailment of school-aged children in North Carolina. In North Carolina, all students are required to take asthma awareness education programs in fourth, sixth, and eighth grades (NCAP and AACN Education and Public Awareness Subcommittee, 2011). Ahmad & Grimes

(2011) examined morbidity with asthmatic children, identifying that if school-aged children were provided self-management education to help promote self-efficacy, morbidity decreased.

Educating teachers. Teachers are with the students throughout the school day. Teachers need to be sure they are properly educated as to how to initially assess a student using their establish AAP. When a student shows signs or symptoms of distress or deterioration, teachers need to know to gather the student's rescue medications if the student doesn't carry their own rescue medications. The NCAP and AANC Education and Public Awareness Subcommittee (2011) established that school nurses need to educate teachers about the potential of indoor allergens or triggers within their classroom and necessary precautions to decrease allergens and triggers to provide optimal safety to each student. Teachers need to be educated about the providing a healthy, supportive learning environment for students with asthma while striving to reduce disruptions within the classroom.

Method

I conducted a program evaluation of the asthma practices at a middle school and an elementary school in eastern North Carolina, comparing existing asthma management interventions to best practice. I focused on the role of the school nurse in implementing asthma management at the schools. The long-term goal of the program evaluation was to contribute to high quality asthma management among school-aged children in eastern North Carolina.

Under the guidance of College of Nursing faculty and an on-site school nurse who was my preceptor, I reviewed school policies and procedures as they related to childhood asthma. I worked with my preceptor for seven weeks to care for the children. The program evaluation included: a) an interview of 2 key informants using five standard questions about the critical roles in managing asthma; b) in conjunction with the daily care provided to the children, review

of 100 school records, assessing students with asthma diagnoses and their availability of action plans; c) a review of components of asthma management policies and procedures at the middle school and elementary school to compare them to evidence-based practices; and d) development of a universal Asthma Action Plan (AAP) that can be implemented at the schools and activated with a parent signature, eliminating the need for a doctor's order.

Sample and Setting

The sample of my program evaluation was an elementary and middle school in Onslow County in Eastern North Carolina. The sample included children ages 6-14. Primary data was collected through a windshield survey to identify the community population, which was largely composed of military families. The Prevention for the Health of North Carolina: Prevention Action Plan (2009) identified that EPA's Indoor Air Quality Tool for Schools Action Kit implemented within schools led to decreases in asthma inhaler use and asthma symptom related visits to the school nurse. Secondary data gathered from the North Carolina Health and Human Services 2016 County Health Data Booklet and the 2012 Onslow Community Health Assessment. North Carolina Health and Human Services 2016 County Health Data Booklet stated that 2014 NC Hospital Discharges with primary diagnosis of asthma ages 0-14 had a total number of 40 with a rate of 90.5 (Onslow Residence). 2012 Onslow Community Health Assessment survey, 28% responded in Onslow County believed asthma is a problem. Onslow County Chronic Lower Respiratory Disease Death Rate, where asthma was counted, was "50.9 per 100,000 compared to North Carolina was 46.4 per 100,000" (p. 62). The asthma rates for children have decreased below the North Carolina state rate.

Data Collection

Data was collected through interviews with a secretary and a first responder office personnel serving as key informants. Questions were developed after identifying study objectives and completing a review of the literature, and were based on best practices. I have compared management of asthma at the schools with current best practice, including assessing for proper use of inhalers and long-term rescue medication use.

Data was also collected using the method of analyzing school records in collaboration with my preceptor while caring for the children, counting the number of students with asthma and an established AAP. The number of first responders each school has in case the school nurse is not present during an emergency was documented.

Findings

The data was collected between January and March 2016. The records of 1,026 students attending two local schools were reviewed for asthma diagnosis and management for comparison to current best practice regarding availability of medication and an asthma management action plan. Table 1 displays the elementary school findings.

Table 1

Asthma Management Components at an Elementary School

Component	# of Students	%
Asthma diagnosis	56	10.7
Inhaler available	34	60.7
Established action plan	22	39.3
Inhaler & action plan established	22	64.7

Table 2 displays the middle school findings.

Table 2

Asthma Management Components at a Middle School

Component	# of Students	%
Asthma diagnosis	56	11.1
Inhaler available	31	55.6
Established action plan	5	8.9
Inhaler & action plan established	5	16.1

These numbers show less than desirable adherence with obtaining medications and asthma management plans. Within the elementary school, parents tended to be more involved and apt to respond with submitting medications and plans. At the middle school, anecdotal evidence was that many children do not initiate the appropriate asthma management unless the disease is debilitating. As children are becoming more independent at this age, it appeared that parents were less directly involved.

Key informants (KI) indicated that they felt they had adequate education and knowledge of the disease and the needs of the children, and they were prepared when medication administration was delegated to them. The KI knew to wait at least one minute between puffs as well as that there was a standing policy in regard to first responders administering medications. KI felt within the school system, some parents and their children understood their diagnosis. They verbalized that the ones that had inadequate understanding sought the school nurse for help.

Both schools were following evidence-based practice in regard to students' direct asthma management. Following evidence-based practice, a medication form was sent home with students along with the physical form to help ensure the form got completed when the child went to the doctor for the annual physical. The school nurse provided the local pediatrician offices with a copy in the event the parent forgot the form. When a student came seeking their inhaler, the nurse assessed the student. Within the assessment, the nurse asked for a description of symptoms by the student, auscultated of their lungs, and utilized nursing judgment to decide whether the child needed administration of their medication. Any administration of the asthma medication was documented. When medications ran low, the nurse sent a letter home to the child's family to inform them a week in advance to ensure there was always medication available for their child should they require it.

Implications for Practice and Policy

As a result of the evaluation, the need to address compliance with actions plans and medications was recognized. Action was taken, including creation of an informational poster and a school nurse initiated universal AAP. The poster was displayed at school open houses and kindergarten registration to inform parents about the need to have an action plan on file for their children. Using best practice, I also developed an emergency action plan that will be distributed at kindergarten registrations and school open houses (see Figure 1). The school nurse can implement this emergency action plan by obtaining a parent signature and an inhaler for the child, without a physicians' order. After the open house, the school nurse plans to reevaluate the number of students with an emergency AAP.

The school nurse-implemented, universal AAP, which can be activated with a parent signature, was designed to increase the number of students with an AAP. This will allow many

students countywide who do not currently have established AAP to have one available during the school day. The universal AAP creates the ability for any faculty or staff to respond appropriately if the child has an asthma attack and the school nurse is not in the building. The AAP will be introduced and made available at a scheduled open house. The AAP was brought forward to the monthly meeting of the county's school nurses and it was suggested that it could be used in all county schools. After the AAP was presented, school nurses were asked about their willingness to utilize the universal AAP, and all school nurses present at the meeting were willing to try it.

This project addressed the goal of improving asthma management among school-aged children in eastern North Carolina through the establishment of a nurse-implemented emergency action plan, as identified in the study by Simon and Akinbami (2016). This project should continue to be monitored, trending the asthma rate, compliance, and availability of inhalers and action plans established for students within these schools. Countywide, use of a nurse-implemented, universal AAP for other schools can be established following the format outline in this project. Before and after implementation, county statistics should be obtained to evaluate the success of the program.

Education, collaboration and follow-up with parents are essential to support children in maintaining control of their asthma, as well as to ensure an adequate supply of their medication for school. Utilizing open houses and kindergarten registration to provide information such as the availability of the universal AAP and medication administration sheets will raise awareness of parents and will promote submission of necessary forms and medication. The program evaluation conducted for this project established valuable baseline information about the asthma

management program in two schools and provided a tool and recommendations for future program development.

Figure 1:

Name: _____

ASTHMA

EMERGENCY ACTION PLAN

SYMPTOMS: Difficulty breathing with short inhalations and longer exhalations, rapid, shallow breathing, wheezing (high-pitched noise heard with breathing), excessive coughing (may cause vomiting), sensation of chest tightness, flaring of nostrils, tingling/numbness in fingers/toes, loss of color in lips.

ACTIONS:

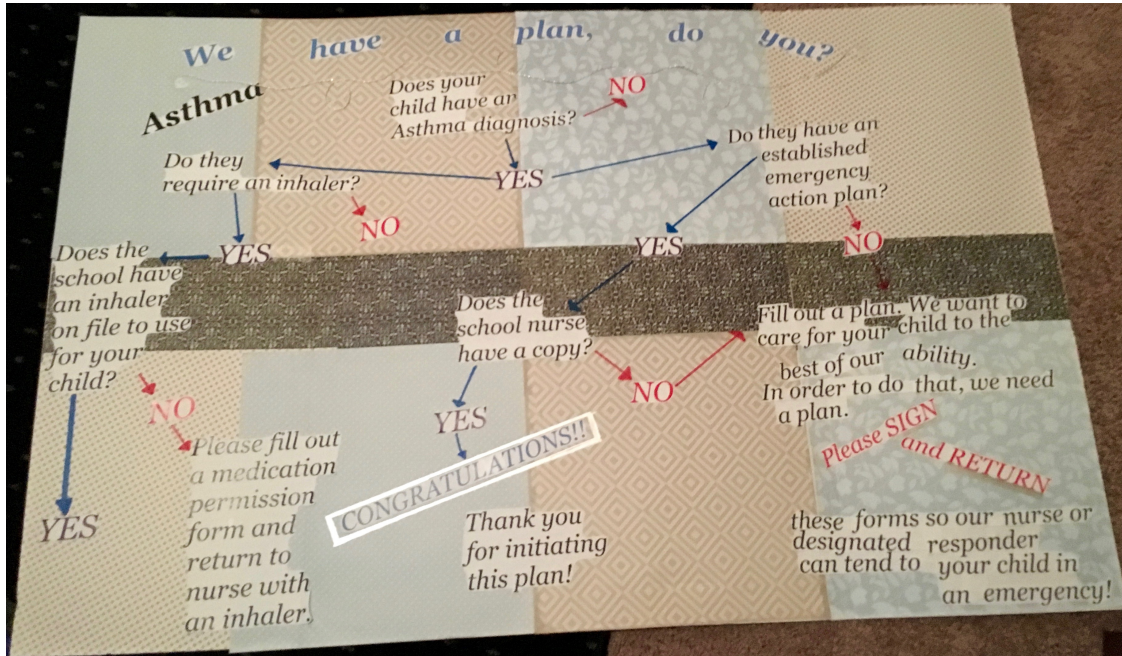
1. Stay with student. Stay calm.
2. Sit student down. Coach student to slowly breathe in through nose, out through mouth.
3. Give student inhaler (rescue medication), as prescribed by Dr. _____.
4. Call parent/guardian. Call school nurse.
5. If severe trouble breathing, no rescue medication available at school, unable to contact parent/guardian, call 911.

This Action Plan was developed and implemented by the school nurse. By signing below, you are indicating that you understand the steps of the action plan and agree with its use for your student.

PARENT/GUARDIAN SIGNATURE _____ DATE _____

NURSE _____ DATE _____

Figure 2:



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