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Promoting Children's Adherence to Asthma Self-Management

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Demetrius Abshire

I am a Junior level student in the College of Nursing at the University of Kentucky. I joined Dr. Patricia Burkhart’s research team in the fall semester of 2004. In my role as a research intern on clinical trials supported by a grant from the National Institutes of Health awarded to Dr. Burkhart, I recently had a manuscript published in the *International Review of Asthma*. The article I co-authored with my mentor Dr. Burkhart was published in English and Japanese for a medical audience. The title is “Children’s Self-Reports of Physical Activity as a Trigger for Asthma Episodes.” I also was awarded the “Best Undergraduate Podium Presentation” for the paper, based on the article, at the First Annual *Student Scholarship Showcase* in the College of Nursing.

In addition to being an undergraduate student and research intern, I currently work at Cardinal Hill Rehabilitation Hospital as a nurse extern. This experience allows me to help others when they need it the most. I have learned to appreciate the importance of medical research and its impact on the healthcare system by providing the evidence that supports our clinical practice. I also am a member of the Delta Psi chapter of Sigma Theta Tau International Honor Society for Nurses.

After earning a Bachelor’s of Science in Nursing, I plan to move directly into the Master’s Program and continue to work with Dr. Burkhart on her research studies. Publication of this paper in *Kaleidoscope* will support my goal of increasing public awareness of effective interventions to enhance children’s adherence to self-management of chronic conditions, such as asthma.

Promoting Children’s Adherence to Asthma Self-Management

**Abstract**

Asthma is the most common chronic childhood condition, affecting about nine million children in the United States. Despite effective treatments available to children and their families, adherence to asthma self-management is low. This paper identifies barriers to asthma-self-management and discusses effective education and behavioral strategies to promote self-management in children with asthma. Implications specific to the profession of nursing are incorporated throughout the discussion. In addition to practical nursing interventions in clinic and hospital settings, areas of future nursing research are addressed.

**Introduction**

Asthma is a chronic inflammatory disorder resulting in obstruction of the airways, which causes recurrent episodes of wheezing, shortness of breath, chest tightness, and coughing that occurs particularly at night and early in the morning (National Asthma Education and Prevention Program [NAEPP], 1997). Asthma is the most common chronic childhood condition, affecting about nine million children and accounting for almost 15 million school absences in 2002 (National Center for Health Statistics [NCHS], 2002). Children 0-17 years of age also had over 727,000 visits to the emergency department (ED) and over 196,000 hospitalizations due to asthma (NCHS, 2002). This disability represents a tremendous financial burden contributing to increasing healthcare costs, especially for those of a lower socioeconomic status. It is important to realize, however, that if preventive measures are taken, hospitalizations and ED visits can be dramatically reduced. Thus, there are many implications for nursing care to promote patients’ adherence to their recommended asthma treatment regimen.

Burdened by an asthma treatment protocol that involves taking inhaled medications, oral agents, and peak flow monitoring, children with asthma often find it difficult to adhere to the prescribed regimen (Bartlett et al., 2002; Burkhart et al., 2002a & b; Carter and Ananthakrishnan, 2003;
Jones et al., 2003; Leickly et al., 1998; Penza-Clyve et al., 2004; Rand, 2002). Thus, the purpose of this paper is to evaluate the barriers contributing to children’s poor adherence to a recommended asthma self-management plan, and to discuss effective interventions nurses can incorporate to improve adherence. A brief list of effective behavioral strategies includes the use of reminders, tailoring, reinforcement, web-based communication systems, and asthma education recommended by the National Asthma Education and Prevention Program. It is important, however, that not only the children, but also their parents are involved in the care of the child with asthma.

Non-Adherence to Asthma Self-Management

Adherence is defined as the extent to which a person’s behavior (e.g., taking medication, following a diet, and/or executing lifestyle changes) corresponds with a health provider’s recommendations (World Health Organization [WHO], 2003). It is estimated that children take only about 50% of their regularly prescribed asthma medications (Gibson et al., 1995; WHO, 2003). Others have indicated adherence rates to be even lower (Bartlett et al., 2002; Marosi and Stiesmeyer, 2001). Although modern technology has enabled healthcare professionals to assess adherence objectively, these high-tech devices cannot provide the explanations for children’s poor adherence to the asthma regimen.

To understand why children do not adhere to their prescribed self-management regimen, qualitative studies have been conducted to shed light on the reasons for poor adherence. A study of 36 children, ages 9-15 years, reported that asthma interfered with factors related to the children’s general well-being, such as having their activities interrupted in order to administer medications and feelings of embarrassment when having to take medications in front of others (Penza-Clyve et al., 2004). Additional reasons included a strict regimen of multiple medications, dislike of some medications, trouble swallowing some of the medications, and adverse side effects (Leickly et al., 1998; Penza-Clyve et al., 2004; Rand, 2002). Children also cited a lack of motivation, nagging parents, difficulty remembering, and even forgetting that they had asthma due to a lack of symptoms, as barriers to consistent adherence (Leickly et al., 1998; Penza-Clyve et al., 2004).

Barriers to Adherence

Previously, children were reluctant to take their prescribed asthma medications due to rules at school prohibiting them from being able to self-carry their medications. Thus, these children had to interrupt class to see the school nurse to take their quick-relief inhalers during asthma episodes (Penza-Clyve et al., 2004). In October 2004, however, President George Bush signed a law allowing children to carry their inhaled medications in school. Therefore, schools need policies to improve asthma care management and each student needs an Asthma Action Plan (individualized instructions on when and how to use relief medications) to guide the child through an asthma exacerbation while attending school.

It is important for clinicians to re-evaluate the child’s Action Plan during routine visits (NAEP, 1997). Teaching children about proper medication administration during an episode is a necessary component of keeping their asthma under control. Teaching strategies may include discussing the negative consequences of poor adherence, such as activity limitations due to increased severity of symptoms. Children may improve their adherence if they understand that preventing asthma episodes could give them greater freedom to participate in daily life activities with their symptoms controlled.

With the dynamics of family structure continually changing, it is important for healthcare professionals to evaluate the home settings of children with asthma. Often, children are living with one parent during the week and another during the weekend. Under these circumstances, it is critical that both parents and guardians understand the importance of strict adherence to the asthma medication regimen. Given that children with closer parental supervision have higher medication adherence rates (Bartlett et al., 2002), nurses need to teach the parents and guardians the importance of overseeing children’s medication taking. Supervision also should be extended to other asthma self-management behaviors, such as peak flow monitoring, which is used to measure how well air is moving out of the lungs. This monitoring is important because, during an asthma episode (attack), the airways of the lungs usually narrow slowly. Although peak flow monitoring is recommended as part of asthma self-management for patients with persistent asthma (NAEPP, 1997) in order to reduce asthma symptoms (Burkhart et al., 2002a & b; Kotses et al., 1995; Marosi and Stiesmeyer, 2001), children often make up their peak flow numbers (Burkhart et al., 2001), thus rendering peak flow monitoring inaccurate. Although it may be difficult and uncomfortable for the nurse to inquire about family situations, the child’s asthma outcomes may be dependent upon this assessment.

Children most often indicate that “reduced motivation” is the reason for inconsistent adherence (Penza-Clyve et al., 2004). Therefore, techniques that increase motivation must be implemented to improve adherence to asthma self-management. Offering children praise and sticker stars, with a reward given after a set number of stars are accumulated, has been shown to be effective as part of an intervention program to improve self-management (Burkhart et al., 2002a & b). Children also indicate that rewards such as special activities, games, food, and money are helpful in reinforcing behaviors (Burkhart et al., 2002a & b; Penza-Clyve et al., 2004).
Strategies to Improve Adherence

Attempts to improve adherence among children with asthma have included several interventions. The most common and simple method utilized is education. According to the NAEPP (1997), asthma education includes: basic facts about asthma, roles of medications, skills (such as using an inhaler, spacer, holding chamber, and self-monitoring), environmental control measures, and when and how to take rescue medications. However, due to children being the key players in their asthma management, education alone is not sufficient to improve adherence. While the importance of education cannot be overlooked in the management of any condition, it is important to include behavioral modifications to improve adherence. When education is combined with behavioral strategies, adherence increases by about 25% (Burkhart and Dunbar-Jacob, 2002a). Interventions including the educational, behavioral, and affective domains are the most effective in improving adherence and patient outcomes (Roter et al., 1998). No single strategy appears to be the best at improving adherence (Peterson et al., 2003; Roter et al., 1998).

In a 5-week randomized controlled two-group clinical trial, 46 children were assigned to either a control group receiving standard care or an intervention group receiving a contingency management intervention including a contract, reinforcement, tailoring, and reminders (Burkhart et al., 2002b). The contract identified behaviors that children were required to perform as part of asthma self-management (e.g., daily peak expiratory flow rate monitoring and diary self-reporting). The behavioral contract was signed by both the child and parent (Burkhart et al., 2002b). Reinforcement strategies included awarding a star for each day that the child followed the agreed-upon contract. After five stars were awarded, the child was to receive a reward negotiated between the parent and child. Tailoring included keeping the diary and peak flow meter in a place the child would remember to use them. Reminders such as Post-It® notes were also incorporated. Results of the study suggested that the intervention group had a slightly higher adherence rate to peak flow monitoring and self-reporting (Median = 79%) than the usual care group (Median = 64%), but the difference was not statistically significant (Burkhart et al., 2002b).

However, there was a 50% decrease in the number of children experiencing asthma episodes from Week 1 to Week 5 of the study. Eighty-six percent of the children (n = 18) reported that rewards were helpful in their remembering to perform the desired tasks and 76% (n = 16) reported that tailoring and Post-It® note reminders were also helpful (Burkhart et al., 2002b).

Because reminders such as Post-It® notes and verbal reinforcement from parents are cited as effective strategies to help children remember to take their asthma medications (Burkhart et al., 2002b; Penza-Clyve et al., 2004), nurses, especially in asthma clinics, should emphasize these methods to parents and children when they come for routine asthma checkups. Although there is no one strategy that has been found to achieve 100% adherence, it is possible to improve adherence by continuing to test age-appropriate adherence interventions in controlled studies and then by sharing with parents and children those that have been found to be successful for different age groups. By applying what is known about a sample of the population, the child and parent can individualize the techniques to make them more effective.

Tailoring children’s asthma treatment regimens to their daily life is a simple, yet effective technique to enhance adherence to asthma self-management. With this technique, parents can assist their children in placing their asthma medications, symptom diary, or peak flow meter where they will be easily accessible. Burkhart et al. (2002b) found that a significant number of children selected the bedroom or kitchen as the place to keep their asthma medications, symptom diary, and peak flow meter, because the children frequent these rooms as part of their daily lifestyle. Some children report that having their asthma medications next to their alarm clocks improved adherence by providing them with easy and convenient access (Penza-Clyve et al., 2004). Another strategy is to place children’s medications on the plate at breakfast or dinner so that the child can easily remember to take the medication (Niggemann, 2005). Tailoring asthma self-management components into the child’s daily routine increases the likelihood of the child incorporating these behaviors on a consistent basis. Thus, nurses should assess and promote this strategy during checkups or hospitalizations.

With the advances of modern technology, web-based communication systems have allowed parents and children to communicate with healthcare professionals while remaining in the home. The use of the Health Buddy (an interactive communication device between children and healthcare professionals) has been shown to improve self-care behaviors (Guendelman et al., 2002). The device is programmed to ask the child ten questions about various aspects of asthma in a dialogue format written at the 3rd grade level. When the child answers the questions, the information is stored, and later at night sent to a data
processing center that processes the responses and publishes them to a website the next day so the nurse coordinator can view the responses (Guendelman et al., 2002).

Although the process may seem tedious for members of the healthcare team to employ, use of the Health Buddy resulted in significantly fewer children having peak flow readings in the yellow or red zones (indicating moderate to severe airway constriction) during the course of the study (Guendelman et al., 2002). Readings in the red zone indicate the need for immediate pharmacologic intervention (such as taking a dose of prescribed Albuterol, a medication to dilate the constricted airways) and often a trip to the ED. Therefore, by using the Health Buddy, there could be a decrease in the number of hospitalizations and visits to the ED related to asthma episodes, resulting in lower healthcare costs and improvement in the general well-being of the child. Perhaps a more feasible option to incorporate is to make interactive communication devices, such as the Health Buddy, part of a daily recommended asthma regimen. After a set period of time (e.g., 4-5 weeks to establish positive self-management routines) the child can stop using the Health Buddy but continue the routines that were incorporated during that time.

The route of medication administration has also been suggested to alter adherence rates. Studies have suggested higher adherence rates to oral medications as compared with inhaled medications (68% vs. 34%) (Jones et al., 2003). Conversely, other studies found no statistically significant difference between mean adherence rates for children taking oral medication compared with inhaled medications (Carter and Ananthakrishnan, 2003).

Although it may be easier and more convenient for children to take asthma medications in pill form, most asthma medications used to treat the underlying inflammation of asthma are inhaled. Failure to take the inhaled corticosteroids can result in exacerbations of the child’s asthma symptoms. Thus, educating and encouraging parents to pay close attention to their child regarding daily inhaler medications to control asthma symptoms can help improve adherence and quality of life.

For children who do adhere to inhaled asthma medications, it is necessary for the nurse to monitor the child’s medication-taking technique. Of the 42 children participating in the asthma self-management clinical trial previously cited who remembered to bring their medication (n = 36) to the education sessions, 92% used their metered dose inhalers (MDIs) incorrectly (Burkhart et al., 2005). After educating the parent and child regarding proper MDI use, giving demonstrations, and assessing the child’s return demonstrations, 81% of the children exhibited accurate MDI technique in a subsequent session one to four weeks later. However, 19% continued to use their MDI medication incorrectly, even after teaching and reinforcement (Burkhart et al., 2005). As this study indicates, nurses are critical in assisting children to manage their asthma. Therefore, nurses in all settings should evaluate children’s use of MDIs at each health encounter to ensure they are receiving the most effective treatment.

Conclusions and Implications for Clinical Practice and Future Research

In summary, asthma is the most common chronic childhood condition requiring a daily treatment regimen to control exacerbations of symptoms. Unfortunately, adherence to asthma self-management is low. Children have identified some of the barriers to self-management such as difficulty adhering to a strict medication regimen, interruption of normal activities, side affects, and other social and personal factors. However, education and behavioral interventions tailored to children can promote adherence to daily self-management and improve asthma outcomes. Rewards or tokens provide immediate gratification to children to continue desired behaviors. Tailoring the treatment regimen to the child’s daily routines can enhance adherence to the asthma treatment regimen. Reminders such as Post-It® notes are simple and effective methods to help the child remember to adhere to his or her self-management.

In addition to the behavioral interventions mentioned, comprehensive education for the child and family support system cannot be overlooked. Children and their parents need to know the importance of taking medications regularly to maintain control of their symptoms. Both the child and the family should understand the consequences of poor adherence.

Increasing motivation to improve asthma self-management has significant implications for nurses. Adults may be motivated to manage their conditions, because they are able to visualize the long-term consequences associated with non-adherence. Children and teenagers, however, are more present-focused. Thus, they require more immediate gratification for adhering to their treatment protocol. Until cognitive development matures and patients can foresee the long-term consequences, however, nurses should institute a plan in which the children with asthma receive positive reinforcement to serve as motivation for their successful adherence.

Technological advances are making it possible to treat individuals in the home setting. The Health Buddy is one such tool. With further research, it may be possible to identify a primary care provider (e.g., physician, nurse, or asthma educator) to assess the child’s asthma on a regular basis and provide support as needed. In addition to being a health resource for patients, the primary care provider can also provide reinforcement and encouragement, both of which have been shown to improve asthma self-management outcomes. It may be possible for future research to develop a cost-effective tool that permits this interactive communication device to provide a direct line between the family and primary care provider.
Identifying different types of rewards for various age groups requires further research. For example, if a small financial reward works well for children over age 10, can researchers claim that it will also work for those under age 10? How much more effective is giving toys as an adherence incentive to a 5-year-old compared with a 10-year-old? By identifying the most effective types of rewards for certain age groups, researchers can aid in the practical application of how to most effectively motivate children and to improve adherence to asthma self-management.

Finally, in addition to studying the most appropriate rewards for various age groups, it is also important to evaluate children's perspectives of barriers to self-management. For example, if children cite forgetfulness as a major barrier to medication adherence, then interventions should focus on reminders (such as Post-It® note reminders). Although current nursing research has provided valuable information regarding barriers to asthma self-management, it fails to identify specific adherence strategies appropriate to each age group. With further research testing adherence interventions in controlled studies, it may be possible to improve asthma self-management in children resulting in improved health outcomes.

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