12-11-2021

Parent/legal guardian Knowledge of Asthma Prevention Management in Children Diagnosed with the Disease: A Quality Improvement Project

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A Scholarly Project Presented to the Faculty of the
Nicole Wertheim College of Nursing and Health Sciences

Florida International University

In partial fulfillment of the requirements
For the Degree of Doctor of Nursing Practice

By

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Approval Acknowledged: _____, DNP Program Director

Date: _____

Abstract

In the pediatric population, asthma is the most common chronic disease, and the most common cause of acute hospitalizations. A review of literature was completed to find a clear correlation between increased knowledge, reinforcement, feedback, and better asthma control. It is postulated that an emphasis on increasing parental/legal guardian knowledge on asthma management and treatment could increase parental/legal guardian confidence and competence in caring for a child with an acute asthma exacerbation, while addressing parental/legal guardian needs in terms of health literacy. This Quality Improvement (QI) project aimed to increase parental/legal guardian competence and confidence in managing their child's asthma after an education session. The goals include decreased urgent care/emergency room visits and hospitalizations, as well as decreased morbidity and mortality for the child. This QI project was completed using pre-test/post-test survey method with an asthma educational session in between, completed by ten participants, which were parents/legal guardians of a child with an existing asthma diagnosis presenting to the urgent care center with an acute exacerbation. The intervention was a 15-minute educational session that discussed basic asthma pathophysiology, risk factors of asthma exacerbations, early assessment of an acute exacerbation, and early intervention with medications at the onset of an exacerbation. A total of 10 parents/legal guardians participated in the study. Participants completed a pretest, they partook in an educational intervention, and completed a posttest. A samples paired t-test was conducted to determine if there was a knowledge change among participants on asthma management in their child. Results showed an increase in the participants' mean knowledge scores from 4 to 7. Health education to parents/legal guardians was found to increase their comprehension and confidence in understanding the management of their child's asthma. Assessing parents/legal guardians

health literacy prior to education is crucial for the health care provider to understand what type of education will be most effective in transmitting information to each individual. This effort can result in decreased urgent care/emergency room visits and hospitalizations, as well as decreased morbidity and mortality for the child.

Keywords: asthma educational intervention and parental/legal guardians, asthma educational intervention and pediatrics, pediatric asthma management

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Introduction

Asthma is a chronic inflammatory obstructive disease that affects the lower airways. It is characterized by exacerbations in which patients may experience symptoms ranging from wheezing, shortness of breath, tachypnea, reduced oxygen saturation, and even loss of consciousness depending on the severity of the exacerbation (David & Smallwood, 2019). In the pediatric population, asthma is the most common chronic disease, and the most common cause of acute hospitalizations (Dondi et al., 2017). It is important to address this clinical condition since it affects many children during their childhood and into adulthood. In adulthood, asthma contributes to other chronic diseases and increased morbidity (Davis & Smallwood, 2019).

Asthma is a complex disease that can be difficult to understand for patients and parents/legal guardians, specifically, if education is not provided and/or reinforced. This may lead to poor compliance with treatments, due to misconceptions about the disease and its overall management. Early intervention at the onset of an asthma exacerbation with inhaled corticosteroids has been shown to improve asthma control and decrease the need for hospitalizations (Stromberg et al., 2018). Understanding when to initiate treatment with rescue medications and the importance of compliance with long term medications for asthma could be the first step to adequately control the disease in a child. However, equally as significant to asthma control and management, are the preventative measures one can take to avoid or decrease instances of an exacerbation. Avoidance of common asthma triggers such as dust mites, pets, or smoking, can all decrease the incidence of an asthma exacerbation (Stromberg et al., 2018).

Problem Statement

A thorough understanding of asthma prevention can change the course of the disease in a child's life but may require that more in depth teaching be provided to parents/legal guardians.

Abu-Shaheen, et al. (2016), highlights the importance of parents' judgment of the severity of a child's asthma, but also emphasizes that many times parental perceptions are skewed as they tend to underestimate the severity and do not relate medication use to asthma attack prevention. If parents/legal guardians had more in-depth knowledge on the importance of avoiding asthma triggers, as well as identifying the initial signs and symptoms of an asthma exacerbation, they may begin treatment with their prescribed inhaled corticosteroid earlier. By doing so, they may reduce the severity of the exacerbation and avoid an urgent care visit.

Significance

Identifying risk factors for asthma exacerbations may be important since it can change the course of the disease, the number of exacerbations, and its management. One modifiable risk factor to control asthma exacerbation is education, which has shown to decrease emergency room utilization (Shechter et al., 2019). If parents/legal guardians are aware of the positive outcomes that follow early intervention during an exacerbation, they may be more inclined to intervene and more likely to avoid acute care services.

When patients are seen for asthma exacerbations in an acute care setting, many times the priority of the visit revolves around resolving the exacerbation and discharging the patient in a timely manner, and little to no time is allocated to education for parents regarding treatment and prevention (Shechter et al., 2019). It is important for health providers to understand the importance of education to prevent asthma exacerbation. Providing education to parents/legal guardians may target the effects of poor asthma treatment and management and prevent long term health complications for the patient.

There are various factors such as socioeconomic, family, and the care received in a pediatric practice or in the acute care setting, that play a role in how effectively a child's asthma is

managed (Stromberg et al., 2018). Understanding what roles these factors play in the treatment of asthma is essential when creating teaching strategies for parents/legal guardians. Complications of asthma are found increasingly amongst children from low-income and minority families (Stromberg et al., 2018). The goal is to tailor education in a manner that is more comprehensible, in order to ensure parent or caregiver compliance while considering socioeconomic factors that act as barriers to care. Resources for parents/legal guardians caring for a child with asthma should be provided.

During an urgent care visit, parents/legal guardians are provided with written material about the diagnosis, but lack education on preventing these exacerbations and how to appropriately use rescue medications to avoid an urgent care visit (Shechter et al., 2019). If a child lacks a primary care pediatrician and the parents/legal guardians rely on asthma control through acute care visits in an urgent care setting, there can be fragmented care and poorly controlled asthma. The management and care of asthma is a multifaceted task that requires in depth of knowledge of the disease and its management, which many parents may lack. As a healthcare provider, one must consider the risk factors present and the misconceptions parents have about the treatment and management of the disease in order to properly address the problem at hand.

Summary of the Literature

A literature search was conducted by using the following databases: ClinicalKey, CINAHL, Medline, and AccessMedicine. Keyword phrases included: asthma education for parents, education interventions on asthma management, and family engagement in asthma control. The search conducted included only peer reviewed systematic reviews, meta-analysis, and primary research studies within the years 2011 and 2021. Studies were included if they

focused on child and adolescents with asthma, and family intervention. Search limitations included several articles written in other languages, and published articles before 2011. The initial search found one hundred and one articles related to the topic of interest. Of those articles, the author chose nine articles that met criteria of the initial search related to parent/guardian education on asthma. The overall theme that these articles centered on was the growth in asthma control in children with increased education tailored towards parents/caregivers. Another theme that emerged was the cultural and environmental factors associated with poor asthma control outcomes in minority households. The articles that will be discussed will focus on specific interventions targeted to increase parent/legal guardian engagement and knowledge on asthma. Overall, the majority of articles found that parent/legal guardian education and asthma control focused the fact that increased education and health literacy contributed to better asthma control in the pediatric population.

Educating children and parents/legal guardians

Saxby et al. (2018), completed a Level II systematic review that looked to find the most effective teaching approaches in asthma and other chronic disease management in children. The systematic review included chronic condition self-management educational interventions in which teaching approaches were translated into practical components. They found that the most effective approaches in educational interventions include structured and sequenced curricula, reinforcement, active participation, collaboration, autonomy, feedback, multiple exposures, and problem-solving. They also found that for infants and toddlers, educational interventions are more effective when directed to parents/legal guardians, in the school age child, a child-focused approach is useful in promoting autonomy, however once reaching adolescence, there is a greater focus on communication, problem-solving, and role division. In the review, they focused not

solely on education aimed at parent/legal guardians, but also looked at the impact that involving children in the education had on the effectiveness of asthma control. A recurring theme noted in the search was the significance of including children in the education and teaching them to work alongside their parents/legal guardians to achieve a higher level of asthma control. In doing so, it is essential to take into account the age group of the child at hand, when educating patients and families. Knowing how to adapt the different techniques within the teaching modalities may be useful when educating children of different ages.

Another important factor in implementing education, is taking into account certain barriers to learning. A study conducted by Kueny et al. (2013), looked to assess the cultural and environmental barriers that affect asthma control in Latino families who have children with a diagnosis of asthma. This is a descriptive qualitative study, that used data collection and analysis. The families included described their experiences in caring for a child with asthma and the barriers they encountered when trying to modify their home environments in order to manage their child's symptoms. An important conclusion they reached was that when implementing an asthma care model to manage the disease of the child, it is crucial to involve the entire family and to see them as a team, placing an emphasis on the child when making life style changes/negotiations. Education directed to the family as a whole may be more effective than education exclusively provided to the parent/legal guardian. This may assist to create an environment in which multiple family members participate in the care of the child, which can reduce stress for the caregiver. Another finding was that families struggled with adhering to recommendations made by the medical provider versus that of lay community members whose opinion is highly regarded. Taking into consideration the families' beliefs and answering their questions in a nonjudgmental manner may increase adherence to the treatment plan.

In their Level II systematic review, Smith et al. (2021), looked to identify engagement strategies used to help children with chronic conditions. The objective was to find engagement strategies to assist children, adolescents, and their caregivers manage chronic conditions. They did so by conducting a search in which they identified 25 systematic reviews that used strategies in relation to patient care, health system, and community policy levels. A major finding included the effectiveness of direct patient care strategies, including self-management support and shared decision making across all pediatric age groups. The direct patient care strategies included self-management support through the use of mobile health applications and tele pharmacy platforms, which showed to have positive benefits for children and adolescents with asthma such as medication adherence and asthma control. One main component that can lead to poor compliance with asthma treatment is children not actively participating in their treatment and relying primarily on parents/legal guardians for disease management. Engaging the child with a technology modality may be an incentive for the child to participate in their treatment plan. In terms of shared decision making between families and providers, agreement with the treatment plan for the child was associated with decreased decisional conflict, increased engagement with treatment, and more parent and caregiver priorities addressed. By providing sufficient education to parents/legal guardians they will be more likely to be active in decision making versus relying solely on the provider to implement treatment plans. An increased understanding may also help parents see the benefits of following a plan and encourage the child to become an active participant in their care.

Everhart et al. (2020), will conduct a study to determine the effectiveness of an evidence-based intervention called Richmond Virginia (RVA) Breathes, which was designed to coordinate pediatric asthma care across family, home, community, and medical sectors, with an aim to

determine asthma control outcomes, asthma symptoms, and quality of life. The RVA Breathes intervention will focus on three aspects which include a family-based asthma self-management education, home environmental remediation, and school nurse support. This would facilitate education across all levels ensuring there is a common understanding about the asthma management of the child. The asthma education will be comprised of four sessions at three-month intervals, which addressed asthma basics, increasing self-management, school and family issues, and empowering the family. In the study, they hope to find an increase in asthma control when there is care coordination between providers, parents/legal guardians, and the community. When there is little to no coordination between healthcare providers, parents, and the community, proper asthma control may be compromised. When educating parents/legal guardians and children, feedback and reinforcement are key to assist in the learning process.

Technology and Education

Culmer et al. (2020) performed a level III systematic review to determine if there was a correlation between telemedical asthma education and improvement of healthcare outcomes for school-age children with asthma. This systematic review focused on determining whether 2-way streaming of asthma-based telemedical education improved asthma-related clinical outcomes. The measured clinical outcomes determined there were improvements in airway inflammation and medication use, and an increase in the child's ability to manage their asthma and properly use inhalers, a significant knowledge gain among children and parents from baseline to intervention, and an increase in quality of life. This telemedical component further credits the significance of technology on increasing asthma control and disease management. The telemedical training addressed both the child and caregiver. This is an example of the effectiveness of an approach aimed toward the family as a whole, versus one aimed toward only

the caregivers. Creating certain incentives for children to cooperate and engage in their asthma treatment may make way for higher levels of control and improved quality of life for both the child and caregiver.

In a cluster-randomized trial by Garbutt et al. (2014), telephone peer coaching for parents and its effects on reducing children's asthma morbidity was examined. They did so over a period of twelve months where 462 families received asthma management training via telephone and 486 families did not. As seen in other studies (Everhart et al., 2020) feedback and reinforcement to parents/legal guardians were correlated with higher levels of comprehension and adherence to the treatment plan which highlights the role of technology in education. The assessment of the intervention was done by means of telephone interviews at 12 and 24 months. Results showed that in 12 months, the children of families receiving the phone asthma management training had more symptom free days, and at 24 months had reduced Emergency Department (ED) visits and fewer hospitalizations compared to those families that did not receive phone asthma management training. When implementing education, it is crucial to note that implementing a patient centered intervention to create a change in behavior related to asthma management may be a complex ordeal. Tailoring the educational plan based on the needs of the parents/legal guardians is essential, and in order to do so, one should continuously address concerns and misconceptions while providing reinforcement throughout the process of education. In doing so, a higher level of education about asthma control may be reached.

Health Literacy and Education

Apter et al. (2013), aimed to find if there was an association between health literacy with adherence and outcomes in moderate-severe asthma. Health literacy is defined as the degree to which individuals have the capacity to obtain, process, and understand basic health information

and services needed in order to make appropriate health decisions. In this Level III longitudinal cohort study, the Asthma Numeracy Questionnaire and the Short Test of Functional Health Literacy in Adults were used to assess the impact of electronically monitored adherence and asthma outcomes over 26 weeks. A total of 284 adults participated, and the results found that numeric and print literacy were associated with better adherence, asthma control, and overall quality of life. Health literacy is a factor that may easily be overlooked by the healthcare provider when implementing an educational intervention for the treatment and management of asthma. When providing education to parents/legal guardians, understanding the level of health literacy may assist to create teaching interventions that will lead to a higher level of comprehension. If the parent/legal guardian has difficulty understanding written material the healthcare provider can tailor teaching to include visual/audio demonstrations versus written information and vice versa, thus creating a learning environment that favors comprehension.

In a systematic review, Tzeng et al. (2017), examined the relationship between health literacy and asthma among children. They conducted an electronic database search and found 13 studies that explored the relationship between parental health literacy and children's asthma. The findings were that children of parents with low health literacy had poor asthma control and increased utilization of health care. When providing education, health care providers must assess the parent/legal guardians health literacy and comprehension. In order to properly control asthma symptoms in their children, the parent/legal guardian must be able to accurately assess their child's asthma symptoms and intervene to prevent exacerbations from occurring.

Miller (2016), performed a meta-analysis to determine if there was an association between health literacy and medication adherence, and if a health literacy intervention improved health literacy and adherence to treatment. To do so, he conducted an electronic database search

that met criteria, and found a total of 220 articles. Miller found that health literacy was positively associated with adherence, and that the association was greater among non-medication regimens. He also found that health literacy interventions had a greater effect on adherence in samples of lower income and of racial-ethnic minority versus higher income samples. This analysis provides insight on health literacy disparities among racial ethnic minority groups and the important role of education on disease management.

Cultural and Environmental Factors Affecting Asthma

In their randomized control trial, Bellin et al. (2011) examined the effectiveness of an asthma communication educational session to improve guideline-based preventive asthma care and reduce asthma morbidity in high-risk inner-city minority children with asthma. This level I study included 300 primarily African American children and caregivers, which were predominantly the biological mother. They determined that poor quality of life was associated with an increased number of children in the home, low asthma control, and increased asthma management stress and life stress. When addressing concerns of the family and the recommendations of the provider, there may be increased continuity of care and better asthma control outcomes. The need for multifaceted interventions to assist parents/legal guardians of children with asthma in coping with management and demands was noted. They found that those caregivers randomized into the educational group reported less frustration and more confidence in their ability to efficiently manage their child's asthma than did the nonintervention group. A major barrier to compliance with the asthma management protocol used to establish adequate asthma control is lack of understanding and knowledge. Taking care of a child with a chronic disease may be overwhelming, particularly if a parent/legal guardian lacks resources and information to assist them in assessing the needs of their child and intervening when appropriate.

Knowledge regarding the child's disease is essential to increase parents/legal guardian's confidence. This will empower them to become more engaged in the management of their child's disease.

In their Level I study, Wilson et al. (2011), conducted a randomized trial of parental behavioral counseling and cotinine feedback for lowering environmental tobacco smoke exposure in children with asthma. Cotinine is an objective indicator and biomarker of tobacco exposure. Caregivers of 519 children aged 3-12 years with asthma and reported smoke exposure participated in the study. A basic asthma education session was provided to half of the group, while the other half received no education. The correlation found was that a higher level of understanding behind the pathophysiology of asthma and its triggers, will motivate parents/legal guardians to change modifiable risk factors, which in this case is the cessation of smoking. To measure this, they collected a urine sample from the child with asthma during the initial assessment and at 6 and 12 months follow up visits following education. They determined that those children whose caregivers received the educational intervention had lower follow up cotinine urine levels compared to the children who were not involved in the education session. By informing parents/legal guardians about asthma triggers treatment and management, a child's asthma may be better controlled. Parents are more likely to feel accountable for changing the environment of the child, specifically when the results of this change are measurable, as seen in the children's lower cotinine urine levels.

In their study, Baptist et al (2020) set out to determine the factors contributing to health disparities in those with asthma during the Covid-19 pandemic. Anonymous surveys were sent to 1171 adult patients with asthma and their providers. The patient survey assessed demographic information including socioeconomic status, asthma control, and health behaviors. They found

that minority patients were more likely to have been affected by the Covid-19 pandemic, had worse asthma control, lower household income, and were more likely to live in urban areas. Also pertinent was the finding of institutional racism which showed minority individuals were less likely to have a primary care physician, had more trouble affording medications, and less likely to have health insurance. In terms of the findings from the providers' surveys, they found that 25% of physicians found it increasingly difficult to care for black individuals with asthma during the pandemic. It is important for health providers to identify health disparities that may affect the proper management of asthma in their patients when providing education which can lead to better disease control.

Perez Jolles et al. (2019), completed a systematic review to understand racial and ethnic minority patients shared decision-making preferences, challenges, and facilitators. They did so through a database search in which they found 18 publications that met criteria. They found that there is overall lack of representation of minority populations in contemporary literature. They also noted that African American and Latino participants were uncomfortable taking an active role with their provider, in terms of not being prepared for a discussion with the provider and believed the provider would not have a positive reaction to a patient taking a more active role. Moreover, barriers found included lack of rapport with providers, and language barriers present. It is crucial as a provider to understand this, in order to more effectively interact with parents/legal guardians. Particularly when providing education, establishing a comfortable relationship with parents may serve to empower them to take greater action in the management of their child's asthma. Making way for open communication and discussion between parent/legal guardian and provider, may increase engagement and confidence in parent/legal guardian control of their child's asthma.

Knowledge Gaps

A common finding in the literature was a lack in continuity of care in asthma management of the pediatric population. It seems as though management of a child's asthma is jeopardized as they do not receive consistent asthma management at home and in the primary care setting. Another knowledge gap encountered was related to parent/legal guardian health literacy. As mentioned before, there is a relationship between a parents/legal guardians health literacy and the child's level of asthma control. This is relevant as the effectiveness of a child's asthma treatment has been shown to increase when the parent/legal guardian are involved in management. Addressing the parent/legal guardian's health literacy may be key to better asthma control.

Conclusion of Summary of the Literature

The studies display a clear correlation between increased knowledge, reinforcement, feedback, and better asthma control. Also, including children, not only parents/legal guardians when providing education, and having them participate in their asthma management leads to better health outcomes. A recurring theme in these articles is that addressing gaps in parent/legal guardian knowledge and understanding on asthma and its management improves asthma outcomes in the pediatric population. Providers must also keep cultural and socioeconomic factors in mind when tailoring care to children with asthma.

Quality Improvement Project

Purpose

Asthma is a chronic inflammatory obstructive disease that affects the lower airways. It is characterized by exacerbations in which patients may experience symptoms ranging from wheezing, shortness of breath, tachypnea, reduced oxygen saturation, and even loss of

consciousness depending on the severity of the attack (Davis & Smallwood, 2019). Early treatment interventions instituted by parents/legal guardians who understand the pathophysiology of asthma and the mechanism of action of the prescribed medications, may be crucial to create positive outcomes in the health of the child.

In the pediatric population, asthma is the most common chronic disease, and the most common cause of acute hospitalizations (Dondi et al., 2017). By educating parents about the signs and symptoms of asthma and proper use of asthma medications, less invasive treatments will be necessary upon arrival at an urgent care facility, and there will be better control of asthma in the pediatric community (Porcaro et al., 2020).

When asthma patients are discharged home after an acute crisis, the clinical site provides parents/legal guardians with written information that includes education about asthma exacerbation prevention. However, there is little to no actual teaching or explanation to parents aside from the discharge paperwork that they are provided with. Assessing the parent's health literacy level is important in order to tailor the parent's teaching based on their level of comprehension. When educating parents about asthma, this factor is not taken into account, and neither are cultural and socioeconomic factors that can have a negative effect in the child's asthma control. The goal of this project is to increase the knowledge of asthma pathophysiology, prevention, and treatment among parents of children diagnosed with the disease.

PICO Question

Does a clinical educational intervention (I) increase the knowledge of asthma pathophysiology, prevention, and treatment (O) among parents of children diagnosed with the disease (P)?

- Population: Children diagnosed with asthma

o Intervention: Education intervention

o Comparison: None

o Outcome: Increased knowledge of asthma pathophysiology, prevention, and treatment

Goals and Outcomes

Educating the parent/legal guardian of a child that presents with signs and symptoms of an asthma exacerbation on the pathophysiology, prevention, treatment, and modifiable risk factors may prevent these exacerbations. Also, increasing parents'/legal guardian's knowledge about asthma, may decrease the incidence of asthma exacerbations that require urgent care visits. The parent/legal guardian will be assessed through a questionnaire prior to education, as well as after the education is provided to determine if there is an increase in knowledge about asthma pathophysiology, prevention, and treatment strategies.

The goals and outcomes of this project are the following:

1. Increased parental/legal guardian competence in asthma control after educational session.
2. Decreased urgent care/emergency room visits/hospitalizations for the child.
3. Decreased morbidity and mortality for the child.
4. Increased confidence for parents/legal guardians when treating their child's asthma.

Definition of Terms

Telemedical Education – Provision of wed based medical education (Culmer et al., 2020).

Health literacy - the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed in order to make appropriate health decisions (Apter et al., 2016).

Cotinine – an objective indicator and biomarker of tobacco exposure found in urine (Wilson et al., 2011).

Institutional Racism- also known as systemic racism, is a form of racism that is embedded through laws within society or an organization (DePriest et al., 2016).

Rapid Estimate of Adult Literacy of Medicine Short Form (REALM-SF)- health literacy measure tool (Health Literacy Measurement Tool, 2020).

Theoretical Framework of the Project

The theoretical framework of this project will be Bandura's Self-Efficacy Theory. This theory refers to an individual's belief in their capacity to execute behaviors that effectively help them achieve specific performance attainments (Bandura, 1977). It highlights the role of an individual's ability to control their motivation, behavior, and social environment. By providing adequate education to parents/legal guardians, they may experience and increased confidence in managing their child's asthma. If the parent/legal guardian has the belief that they can produce desired effects by their actions, they will be more motivated and inclined to actively participate in their child's care, both in the educational process, and the management of care thereafter.

Methodology

Project Design / Sample / Setting

The Quality Improvement (QI) project followed a quasi-experimental research design consisting of a pretest, an asthma educational session intervention, and a post-test. The sample population in this project consisted of 10 parents/legal guardians of children up to 21 years of age, previously diagnosed with asthma, who presented to a large south Miami pediatric urgent care. Exclusion criteria consisted of children not previously diagnosed with asthma. The parent/legal guardian's knowledge of asthma and health literacy was assessed through a questionnaire prior to

education, as well as after the education is provided, to determine if there was an increase in knowledge about asthma pathophysiology, prevention, and treatment strategies. Education to the parents was provided through visual aids and demonstration along with written education they are provided with, depending on the health literacy score of each participant.

Intervention

The author will be administering the educational intervention projected to last between 15 and 20 minutes as well as a pre-test and post-test. The intervention consisted of an educational session which focused on basic asthma pathophysiology, risk factors of asthma exacerbations, early assessment of an acute exacerbation, and early intervention with medications at the onset of an exacerbation. The educational session was conducted by the author using varying teaching modalities, including visual charts with asthma pathways and control, models to show the pathophysiology of the disease, and tools such as inhalers used for demonstration purposes that allowed for easy repeat demonstration on the parents' behalf. The parents/legal guardians were given the opportunity to ask questions.

Measures/Instruments

The QI project utilized the Qualtrics System to collect the pre-test, information about barriers that affect the learning process, such as health literacy by using the Rapid Estimate of Adult Literacy in Medicine-Short Form (REALM-SF), and post-test data from participants. The REALM-SF is a 7-item word recognition test that provides clinicians with a quick assessment of patient health literacy; it has a scoring rubric that provides scores and grade equivalents for the participants.

The pre-test included questions about basic asthma pathophysiology, modifiable risk factors that may exacerbate an acute asthma episode in a child, and adequate medication use at the onset

of an acute exacerbation. Also, prior to the educational session, barriers preventing learning such as health literacy were assessed. The parents/legal guardians completed the Rapid Estimate of Adult Literacy in Medicine-Short Form (REALM-SF) in order to obtain their health literacy measure. A post-test, identical to the pre-test format, was completed by the participant to determine their knowledge acquisition.

Data Collection

Methods to recruit the sample consisted of identifying children (previously diagnosed with asthma) up to 21 years of age who presented to a large south Miami pediatric Urgent Care Center with an acute asthma exacerbation. Pre-test and post test data, as well as barriers preventing learning, such as health literacy were collected from the participants in person.

Data Analysis

Information about barriers that affected the respondents' learning process, such as cultural and socioeconomic factors were analyzed via Qualtrics. The Qualtrics platform provides information such as the mean, standard deviation, variance, and number of respondents. Health literacy will be measured via the REALM-SF. Statistical data analysis was carried out through the use of a paired t-test to compare the pre and post test results to determine participants' knowledge acquisition about asthma pathophysiology, modifiable risk factors that may exacerbate an acute asthma episode in a child, and adequate medication use at the onset of an acute exacerbation.

Protection of Human Subjects

The protection of human subjects was established through Florida International University (FIU) Institutional Review Board approval (IRB). In order to protect the rights and privacy of the human subjects, the parents/legal guardians signed an informed consent form if they decided to

participate in the study that outlines what the study entails and aims to accomplish, as well as information regarding data collection and storage. The pre and post-tests was anonymous, and the participants' personal information such as their name, address, and phone number were not included. Benefits of participation in the study include an increased comprehension of asthma management. No risks have been identified.

Results

Description of Sample

A total of 10 parents/legal guardians participated in the study, Table 1 depicts the overall demographic characteristics of the sample. Figure 1 shows the gender distribution of the sample, majority being women participants. Of the ten participants, the majority of participants were of Black and Hispanic ethnicities, making up eighty percent (80%) of the sample (Figure 2). Fifty percent (50%) of the sample ranged between the age group of 31-40 years, while only ten percent (10%) ranged between the ages of 51-60 years of age (Figure 3).

Table 1

Demographic Characteristics of the Sample

Characteristic	Frequency	Percent
Gender		
Women	6	60.0
Men	4	40.0
Age		
18-30 years	2	20.0
31-40 years	5	50.0
41-50 years	2	20.0
51-60 years	1	10.0
Ethnicity		
Black	4	40.0
Caucasian	2	20.0
Hispanic	4	40.0

Figure 1.

Gender Distribution of Sample

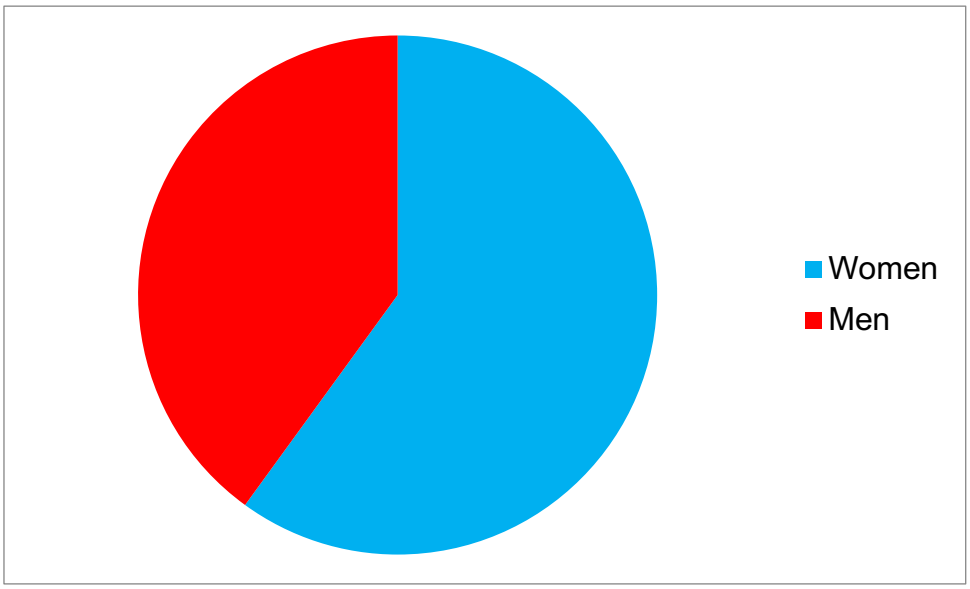


Figure 2.

Ethnic Distribution of Sample

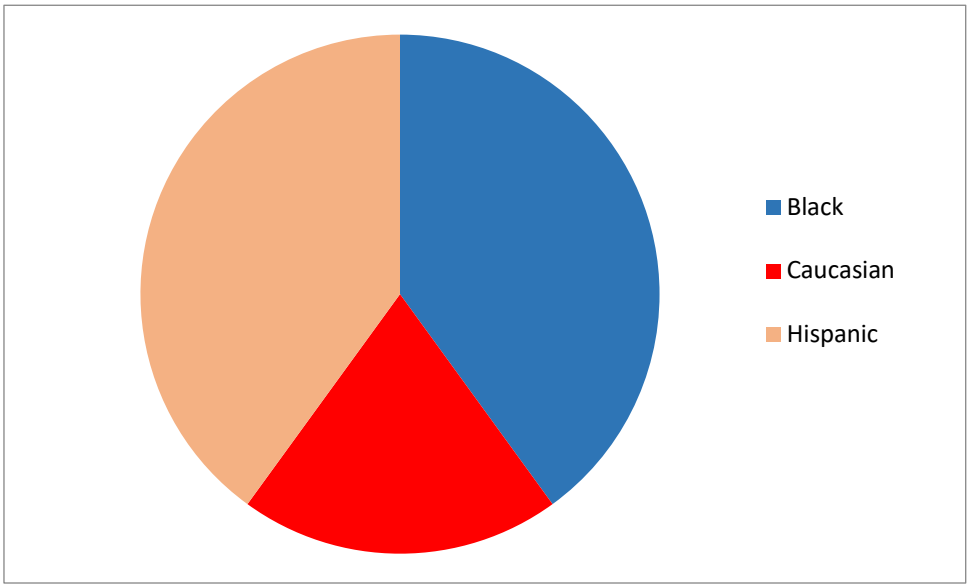
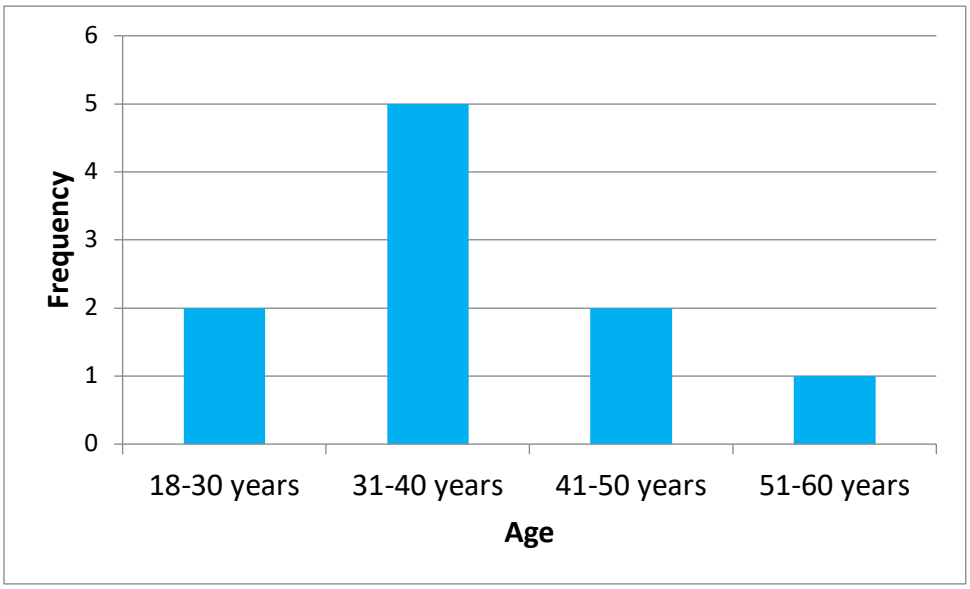


Figure 3.

Age Distribution of Sample



Health Literacy Assessment

Before answering the pre-test questions, participants' health literacy scores were assessed using the REALM-SF. The REALM-SF uses a score system of zero to seven, based on the individual's capacity to recognize the medical terms being presented. A score of zero, indicates a third grade and below health literacy score, indicating need for repeated oral instructions, with educational materials of primarily illustrations or audio. A score of one to three, indicated a fourth to sixth grade literacy level, showing a need for low-literacy materials, while a score of four to six, indicated a seventh to eight grade literacy level, which show a preference for low-literacy patient educational materials. Finally, a score of 7 indicated a high school literacy level in which individuals will be able to read most patient educational materials. Thirty percent (30%) of participants received a score of 7, indicating their health literacy was at a high school level. Forty percent (40%) of participants scored 4-6, or at a seventh to eighth grade level, and thirty percent (30%) of participants scored between 1-3, or at a fourth to sixth grade level.

Pre-and Post-test Analysis

In the pre-test, survey participants were asked a series of questions to gather a baseline of their knowledge related to asthma care and management in their child, including basic pathophysiology of asthma, asthma triggers, and accurate use of short-term and long-term medication. Participants' knowledge was assessed with a knowledge score of zero to ten. The overall pretest knowledge score was a four. Participants increased their knowledge after participating in the educational course, with an overall average posttest knowledge score of 7. Figure 4 illustrates the participants' knowledge assessment related to pre- and post-survey.

Figure 4

Average Knowledge of Asthma Prevention Before and After Intervention

Hypothesis Testing

A paired samples t-test was conducted to evaluate the hypothesis that average knowledge of asthma prevention will increase after the intervention. In a one-tail test there was a significant increase in the average knowledge of asthma prevention score, $t(9) = 5.346$, $p < .001$ (Table 2).

Table 2

Differences in Knowledge of Asthma Prevention Before and After the Intervention

Pre-Intervention		Post-Intervention		*t*(9)
M	SD	M	SD	
3.60	2.459	7.00	1.764	5.35***

***p < .001

Discussion

Throughout the literature review, there was a clear correlation between increased knowledge, reinforcement, feedback, and better asthma control. Identifying risk factors for asthma exacerbations may be important since it can change the course of the disease, the number of exacerbations, and its management. By educating parents about the signs and symptoms of asthma and proper use of asthma medications, less invasive treatments will be necessary upon arrival at an urgent care facility, and there will be better control of asthma in the pediatric community (Porcaro et al., 2020). It was noted that addressing gaps in parent/legal guardian knowledge and understanding on asthma and its management improves asthma outcomes in the pediatric population.

Providers must also keep in mind the health literacy of the parent/legal guardian when providing education to ensure adequate comprehension. Based on the data analysis, there was a statistically significant increase in confidence and competence among participants after the applied interventions. This included the 15-minute asthma educational course, tailored to each participants' specific health literacy score. After assessment of each of the participant's health literacy score, the educational intervention was altered accordingly. For participants scoring a zero to three in health literacy, educational materials focused on visual educational materials, with pictures, and demonstration inhalers, with little to no written materials used. Information

was reinforced multiple times throughout the session, in which they were asked to repeat information learned, and complete return demonstrations of medication administration techniques. For participants scoring a health literacy score of four to six, educational materials were similar, with visual aids, with less focus on reinforcing information several times.

Participants were still asked to complete return demonstrations and were asked if they needed any further reinforcement on any topics covered. Finally, for participants scoring a health literacy score of seven, educational materials consisted of visuals with the incorporation of written educational materials. These participants were still asked to complete return demonstrations and given time to address any information they needed reinforcement or clarification on.

Limitations

Limitations of the study included time constraints enacted upon the project from the COVID-19 pandemic, in terms of additional clearances needed to interact with participants and formulating a mitigation plan before initiating the study. Also, there were time restraints in trying to maintain the 90-minute length of stay of patients visiting the urgent care center, with higher volumes of patients being seen during conduction of the study.

Implications for Advanced Nursing Practice

As vital stakeholders in urgent care centers, it is the role of the APRN to provide treatment and care to patients using the latest standardized and evidence-based practices. Along with providing treatment, health education is an important role the APRN must fulfill to ensure proper continuity of care beyond the healthcare facility. In this setting, the APRN is at an exemplar position to educate parents/legal guardians on asthma care and management in aiming to prevent future avoidable visits to higher care facilities, hospitalizations, and future asthma

exacerbations in the child. The results of this QI study highlight the significance of addressing health literacy in the education of patients. Assessing the health literacy prior to teaching is essential in order to facilitate learning and avoid assuming patients level of comprehension. This will also allow one to become more aware when providing patient education and stray away from using medical jargon which most patients may have difficulty understanding, thus increasing effectiveness of education. This can have a positive impact on the pediatric patients' morbidity, mortality, and compliance with the treatment plan.

Dissemination and Sustainability

The results of this QI project can impact advanced nursing practice in various manners. The project's findings will likely be used as a basis to implement a health literacy assessment for parents as part of the intake process which nurses complete upon triaging patients, prior to providing parents with the educational component. This will give insight to providers when educating parents/legal guardians on their child's diagnosis and treatment plan. Involving other key stakeholders including clinical educators, physicians, and staff nurses, would be vital in the roll-out of this next step in the QI plan. Additionally, this would require educational resources for providers to use in tailoring education to parents/legal guardians to ensure adequate comprehension, as well as education to staff nurses in completing the health literacy assessment.

Lastly, project findings will be submitted for presentation to the American Academy of Pediatrics for presentation in the 2022 National Conference and Exhibition, and a manuscript submission to the American Journal of Nursing.

Conclusions

Health education to parents/legal guardians was found to increase their comprehension and confidence in understanding the management of their child's asthma. Assessing parents/legal

guardians health literacy prior to education is crucial for the health care provider to understand what type of education will be most effective in transmitting information to each individual. This effort can result in decreased urgent care/emergency room visits and hospitalizations, as well as decreased morbidity and mortality for the child. As demonstrated by the findings of the QI project, implementation of health literacy assessments prior to providing education, may be essential in increasing the effectiveness of teaching. Also noted throughout the QI project was that addressing gaps in parent/legal guardian knowledge and understanding on asthma and its management improves asthma outcomes in the pediatric population.

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Appendix A: FIU IRB Approval

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Office of Research Integrity
Research Compliance, MARC 414

MEMORANDUM

To: Dr. Ivette Hidalgo
CC: Jasmine Lema

From: Maria Melendez-Vargas, MIBA, IRB Coordinator

Date: July 22, 2021

Protocol Title: "Increasing Knowledge of Asthma among Parents of Children Diagnosed with the Disease: A Quality Improvement Project."

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #: IRB-21-0326 **IRB Exemption Date:** 07/22/21
TOPAZ Reference #: 110565

As a requirement of IRB Exemption you are required to:

1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
3) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at http://research.fiu.edu/irb.

MMV/em

Appendix B: Consent Form

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ADULT CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Increasing Knowledge of Asthma to Parents of Children diagnosed with the Disease

SUMMARY INFORMATION

Things you should know about this study:

- **Purpose:** The purpose of the study is to evaluate and increase your knowledge about asthma, its triggers, signs and symptoms, and use of medications.
- **Procedures**: If you choose to participate, you will be asked to complete a pre- and post-survey and attend a 15 minute educational session on asthma.
- **Duration:** The pre-test and post-test will take 10 minutes each to complete , and the educational session will last 15 minutes.
- **Risks**: There are no risks for participants in this study.
- **Benefits:** The main benefit to you from this research is gaining knowledge and increasing confidence and competence about asthma management in children.
- **Alternatives:** No known alternatives available to you other than not taking part in this study.
- **Participation:** Taking part in this research project is voluntary.

Please carefully read the entire document before agreeing to participate.

PURPOSE OF THE STUDY

The purpose of this study is to is to evaluate and increase your knowledge about asthma, its triggers, signs and symptoms, and use of medications.

NUMBER OF STUDY PARTICIPANTS

If you decide to be in this study, you will be one of 20 people in this research study.

DURATION OF THE STUDY

Your participation will involve completing a pre-test and post-test which will take 10 minutes each to complete, and attendance to a 15-minute educational session regarding asthma management in children.

PROCEDURES

If you agree to be in the study, we will ask you to do the following things:
1. Complete a pre-test survey via Qualtrics.
2. Attend a 15-minute educational session on asthma management in children.
3. Complete a post-test survey via Qualtrics after the educational session.

RISKS AND/OR DISCOMFORTS

Participants are not expected to experience minimal risks, harms, or discomfort through the participation of this quality improvement project. The risks are not greater than those faced in normal life while participating in a similar activity. There is no cost or legal intervention. If a participant feels uncomfortable with any of the interactions or is concern about the content of the information shared with the interviewer, he/she may choose to withdraw from the study.

BENEFITS

The study has the following possible benefits to you: increased knowledge, competence, and confidence regarding managing your child's asthma.

ALTERNATIVES

There are no known alternatives available to you other than not taking part in this study. Any significant new findings developed during the course of the research which may relate to your willingness to continue participation will be provided to you.

CONFIDENTIALITY

All data will be collected anonymously. No identifiable private information will be collected as a part of the pre-test and post-test surveys. Only investigators will have access to the completed pre-test and post-test surveys. There will be no hard copies of the pre- or post-test surveys. Data collected from the pre-test and post-test surveys will be tabulated via Qualtrics, an online system, and will be maintained on a password protected laptop computer.

USE OF YOUR INFORMATION

No personal identifiable information will be used for this study.

COMPENSATION & COSTS

There will be no compensation provided to you for your participation. There are no costs to you for participating in this study.

RIGHT TO DECLINE OR WITHDRAW

Your participation in this study is voluntary. You are free to participate in the study or withdraw your consent at any time during the study. You will not lose any benefits if you decide not to participate or if you quit the study early. The investigator reserves the right to remove you without your consent at such time that he/she feels it is in the best interest.

RESEARCHER CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues relating to this research study you may contact Jasmine Lema, at Florida International University [redacted]

IRB CONTACT INFORMATION

If you would like to talk with someone about your rights of being a subject in this research study or about ethical issues with this research study, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT

I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. By clicking on the Qualtrics link I agree to participate in this QI project.

Appendix C: NCH Letter of Support

6/17/21

Dear Ms. Lema

This letter is to confirm approval of your Quality Improvement project, "Asthma Education in the Pediatric Population" contingent upon FIU IRB review and approval, as well as a formal presentation to the Nursing Research and Evidence-Based Practice Council at Nicklaus Children's Hospital. We support completion of this quality improvement educational initiative at Nicklaus, and request that prior to any work beginning you share your IRB decision letter with us. The goals of this project align with those of our organization, and we welcome the opportunity to support this project at Nicklaus Children's Hospital.

Sincerely,

Danielle Sarik, PhD, APNP-PC, RN

Danielle Sarik PhD, APRN, CPNP-PC
Research Nurse Scientist
Nicklaus Children's Hospital
(786) 624-2314

Appendix D: Recruitment Letter

Recruitment Letter for Parent/legal guardian Knowledge of Asthma Prevention Management in Children Diagnosed with the Disease: A Quality Improvement Project

Dear parent/legal guardian,

My name is Jasmine Lema, and I am a student from the graduate nursing department at Florida International University. I am writing to invite you to participate in my quality improvement project. The goal of this project is to improve parental/legal guardian knowledge of asthma prevention and management in children. You are eligible to participate in this project because you are a parent/legal guardian of a child diagnosed with asthma. I am contacting you with the permission of the Nursing and Evidence Based Council at Nicklaus Children's Hospital.

If you decide to participate in this project, you will be asked to complete and sign a consent form for participation. You will complete a pre-test survey and health literacy test which is expected to take approximately 15 minutes. Then you will be asked to participate in an asthma educational session, which is expected to last approximately 15 minutes. After the asthma educational session, you will be asked to complete the post-test questionnaire, which will be expected to take approximately 10 minutes. No compensation will be provided.

Remember, this is completely voluntary. You can choose to participate in the project or not. If you'd like to participate please click on the link provided (link for Qualtrics questionnaire). If you have any questions about the study, please email me or contact me at [redacted] or [redacted].

Thank you very much.

Sincerely,

Jasmine Lema

Appendix E: Health Literacy Test

REALM-SF Score Sheet

Patient ID #: _____ Date: _____ Examiner Initials: _____

Behavior _____
Exercise _____
Menopause _____
Rectal _____
Antibiotics _____
Anemia _____
Jaundice _____

TOTAL SCORE _____

Administering the REALM-SF:

Suggested Introduction:

"Providers often use words that patients don't understand. We are looking at words providers often use with their patients in order to improve communication between health care providers and patients. Here is a list of medical words.

Starting at the top of the list, please read each word aloud to me. If you don't recognize a word, you can say 'pass' and move on to the next word."

Interviewer: Give the participant the word list. If the participant takes more than 5 seconds on a words, say "pass" and point to the next word. Hold this scoring sheet so that it is not visible to the participant.

Scores and Grade Equivalents for the REALM-SF

Score	Grade range
0	Third grade and below; will not be able to read most low-literacy materials; will need repeated oral instructions, materials composed

	primarily of illustrations, or audio or video tapes.
1-3	Fourth to sixth grade; will need low-literacy materials, may not be able to read prescription labels.
4-6	Seventh to eighth grade; will struggle with most patient education materials; will not be offended by low-literacy materials.
7	High school; will be able to read most patient education materials.

Appendix F: Pre- and Post-Test

Demographic Information:

Gender: Female _____ Male _____

Age: 18-30 yrs. ____31 – 40 yrs. ___41-50 yrs. ___51-60 yrs. ___>60 yrs____

Ethnicity: Hispanic___ Black___ Caucasian___ Asian____Native American__Pacific Islander___

1. Asthma symptoms:
A. Can come and go over time
B. Include coughing, wheezing, chest tightness, and shortness of breath
C. Can signal a severe asthma attack
D. All of the above

2. Asthma triggers include:
A. Allergens (pollen, mold, dust, pet dander)
B. Strong odors (perfumes, paints, cleaners)
C. Colds, flu, and respiratory infections
D. All of the above

3. Correct asthma management includes:
A. Staying away from asthma triggers
B. Taking medicines as prescribed and using correct techniques
C. Watching asthma to notice signs it's getting worse
D. Knowing what to do for both daily and emergency asthma management
E. All of the above

4. Children with asthma should:
A. Never exercise
B. Limit exercise
C. Work with their doctor on a plan that encourages exercise and prevents exercise-induced asthma attacks

5. What is true about quick-relief asthma medicine?
A. They are taken as needed to relieve symptoms
B. They are taken by using a nebulizer
C. They are taken by using a metered-dose inhaler
D. They last a short period of time
E. All of these

6. How do quick-relief asthma medicines work?

A. They help open or dilate your airways
B. They make you feel calm, so you can breathe more slowly
C. They make you breathe faster so you get more air into your lungs
D. None of these

7. It's fine to wait several hours after your child's symptoms begin to take quick-relief medicine.
A. True
B. False

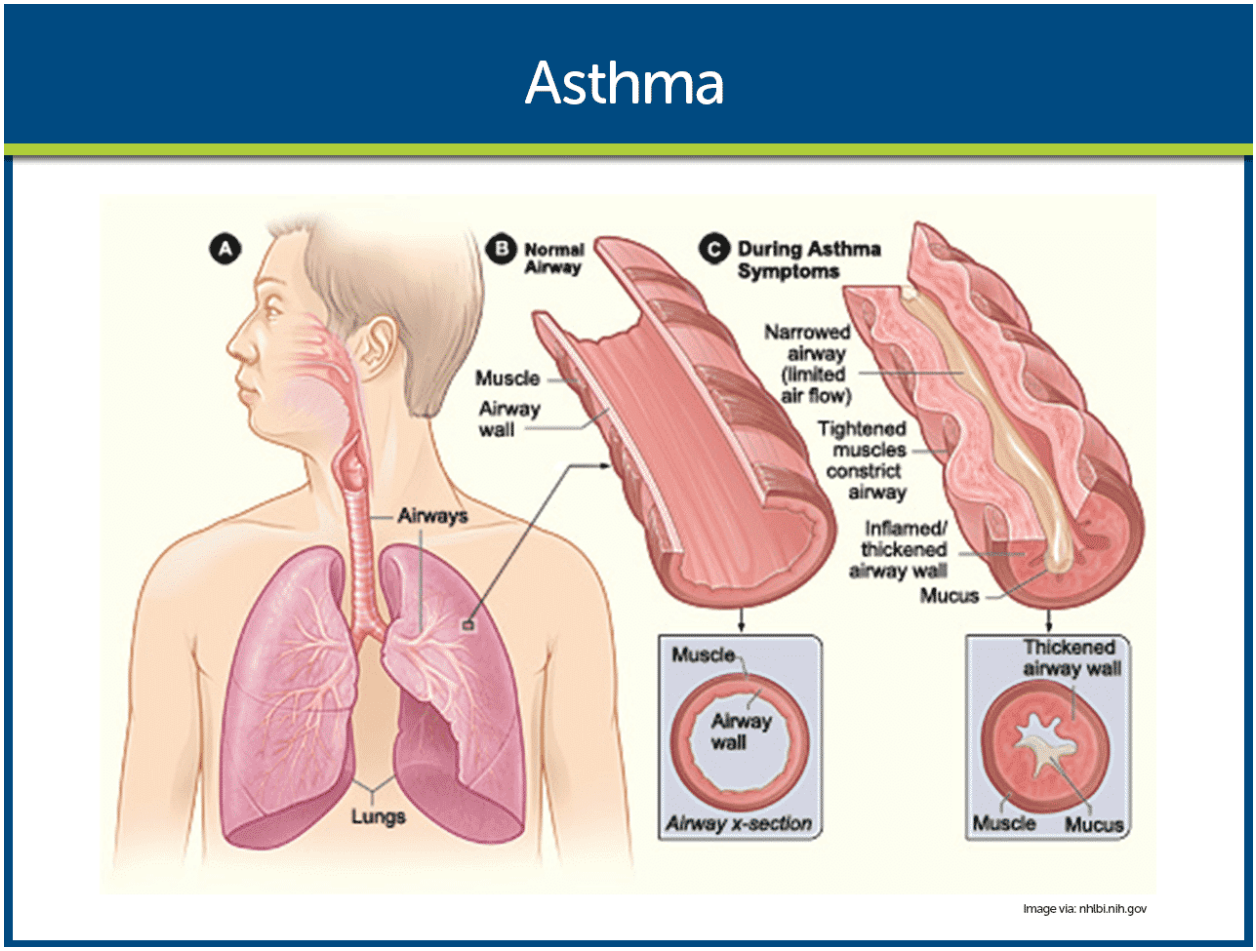
8. The effects of quick-relief asthma medicine last for days or weeks after you use it.
A. True
B. False

9. Quick-relief asthma medicine can be used as often as needed.
A. True
B. False

10. The best place to keep your child's quick-relief inhaler is at home.
A. True
B. False

Appendix G: Educational Intervention

Asthma Pathophysiology



What Is Asthma?

Asthma is a condition that causes breathing problems. Kids may cough, wheeze, or be short of breath. This happens because airways in the lungs get swollen, smaller, and filled with mucus.

How Does Asthma Affect Breathing?

In asthma, air doesn't move through the lungs the way it should. Normally, when someone breathes in, air goes in through the nose or mouth, down the windpipe (trachea), and into the airways (bronchioles) of the lungs. When people breathe out, air exits the body in the

opposite direction. With asthma, air has a harder time passing through. Airways swell and fill with mucus. The muscles around the airways tighten, making airways narrower.

Risk factors of asthma exacerbations

What Are Asthma Triggers?

One way to help manage your child's asthma is to avoid asthma triggers. These are things that are harmless to most people but can cause flare-ups in kids with asthma.

Common asthma triggers include:

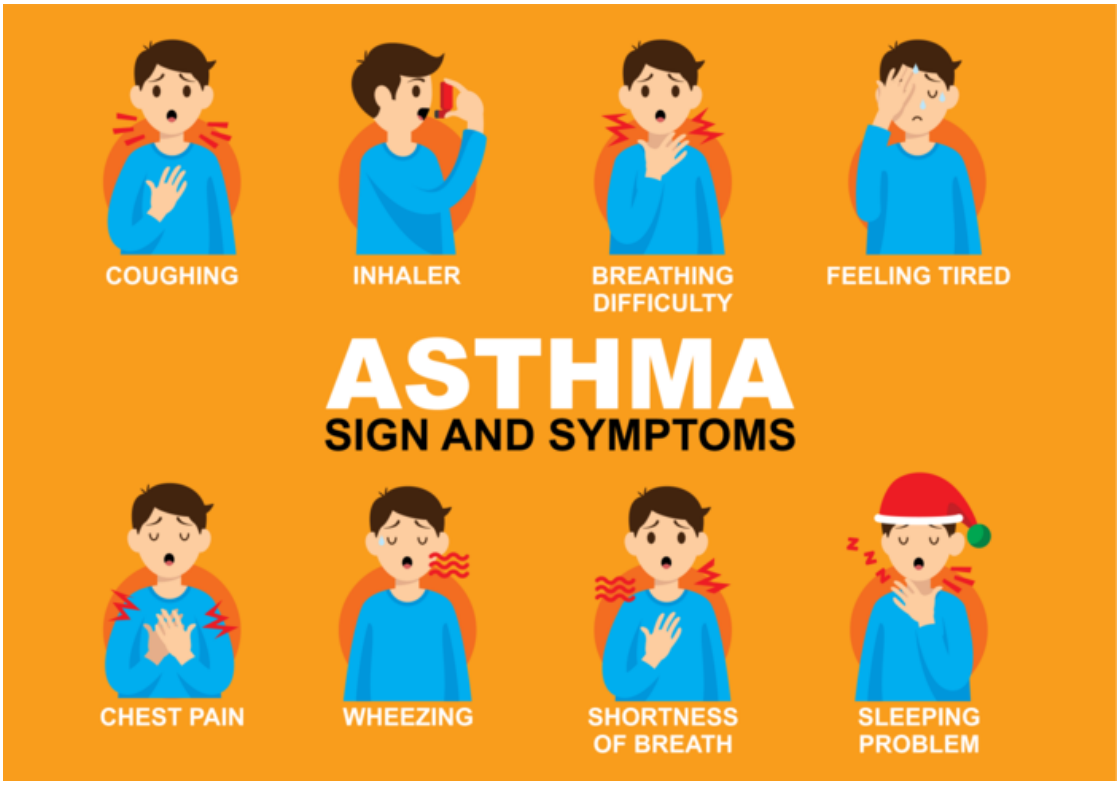
- allergens like pollen, mold, and pet dander
- dirty air (irritants or pollutants)
- respiratory infections, like colds or the flu
- weather conditions
- exercise
- gastroesophageal reflux (GER)

Other, less common triggers include laughing, crying, and use of some medicines.

What Are My Child's Asthma Triggers?

Triggers are different for each child. Kids can't avoid all triggers all the time. But watching carefully to learn what those triggers are and then helping your child avoid them can keep asthma symptoms under control. You can also write down when and where symptoms happened to help you identify possible triggers.

Early assessment of an acute exacerbation



What Are the Signs and Symptoms of Asthma?

Asthma Flare-Ups

Flare-ups are when asthma symptoms get worse. They happen when airways get more irritated and inflamed (swollen) than usual. During a flare-up, kids might have:

- trouble breathing
- a tight chest
- a whistling sound while breathing (wheezing)
- a cough
- a fast heartbeat

Some flare-ups are serious, but others are mild. Flare-ups can happen suddenly or build up over time, especially if kids don't take their asthma medicines as directed.

Early intervention with medications at the onset of an exacerbation

How Is Asthma Treated?

There's no cure for asthma, but it can be managed to prevent flare-ups. Asthma treatment involves two important things: avoiding triggers and taking medicine.

Asthma Medicines

How Do Quick-Relief Medicines Work?

Quick-relief medicines (also called **rescue medicines** or **fast-acting medicines**) do what their name says. They work immediately to relieve symptoms of an asthma flare-up as it's happening. They open up the airways to relieve symptoms like wheezing, coughing, and shortness of breath. The most-prescribed quick-relief medicines (like Albuterol) are quick-acting **bronchodilators** (usually given through an inhaler or a nebulizer). If a bronchodilator alone doesn't ease a severe flare-up, other medicines may be given by mouth or injection to help treat it.

If your child has been prescribed quick-relief medicine, it's important to always keep it on hand. That means at home, at the mall, at sports practice, and even on vacation. Talk with your doctor about how often your child needs it. If it's too often, the doctor also might prescribe a daily long-term control medicine to help prevent asthma flare-ups.

How do Long-term Medicines Work?

Long-term control medicines (also called **controller medicines** or **maintenance medicines**) work over a period of time to ease airway swelling, limit mucus, and help prevent asthma symptoms. They should be taken as prescribed, even when your child seems well. There are a variety of long-term control medicines, but inhaled corticosteroids are the most common. Long-acting bronchodilators also can be prescribed. These medicines relax the muscles of the airways for up to 12 hours. Even if your child takes long-term control medicine regularly, quick-relief medicine is still needed to handle flare-ups when they happen.