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Abstract

Designing an Adolescent Asthma Virtual Education Program

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Emory University

Abstract

Asthma is one of the most common chronic diseases experienced in childhood, but less than 50% of pediatric patients have appropriate treatment adherence to their asthma treatment plan and 40-98% of children with asthma do not use their inhaler correctly (O'Connor et al., 2023). Previous studies have indicated that healthcare education delivered through mobile device applications results in improved knowledge, adherence to medications, and improved clinical care (O'Connor et al., 2023). The purpose of this DNP scholarly project is to design a virtual educational program aimed at adolescent patients diagnosed with asthma to better inform them about the disease, the importance of proper administration of treatment, and begin to increase their responsibility in their care.

Designing an Adolescent Asthma Virtual Education Program

Olivia Hoffman[1]

[1] Nell Hodgson Woodruff School of Nursing

Emory University

Acknowledgements

Thank you to Emory University and my faculty lead Dr. Beth Ann Swan for supporting me throughout the creation of this project.

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Designing an Adolescent Asthma Virtual Education Program

Asthma is a chronic disease that affects the pediatric population as young as five years old and continues throughout the child's lifespan (Asthma in Children, n.d.). Asthma is caused by constriction in the lungs that produces symptoms including wheezing, shortness of breath, and other respiratory symptoms. In the United States (U.S.), asthma affects 8.4% of pediatric patients and is the leading cause of missed school days. Males were found to be more likely than females to have severe asthma exacerbations in both childhood and adolescence. Additionally, the Hispanic population and African American population in the U.S. were found to have an increase in prevalence, hospitalizations, and mortality from asthma (Lizzo & Cortes, 2023).

Background

Asthma can be well-controlled in children, but also can lead to periods of exacerbation. These periods of exacerbations can be triggered by dust, secondhand and thirdhand smoke, allergies, upper respiratory infections, and exercise (Asthma Triggers, n.d.). Children with asthma often need medications to help improve their level of asthma control and limit any exacerbations. Commonly prescribed medications include long-acting inhaled corticosteroids (ICS) and short-acting bronchodilations such as albuterol. Children diagnosed with persistent asthma will administer an ICS everyday as a maintenance medication. In contrast, albuterol inhalers are a type of rescue inhaler prescribed to reduce airway constriction during periods of exacerbation or a before a known trigger such as exercise (Inhaled Corticosteroids for Asthma, n.d.).

Proper use of these medications can lead to the asthma symptoms being well controlled. However, when asthma is not properly controlled, asthma exacerbations can lead to approximately 2 million emergency room visits, 10 million outpatient visits, and 100 million days of restricted activity (Asthma Triggers, n.d.). Healthcare providers can perform spirometry,

which is a type of pulmonary function test, to assess the child's level of asthma control. Additionally, if the child is older than twelve years, there are standardized questionnaires the child can complete to also provide information regarding their level of asthma control. These include: Asthma Therapy Assessment Questionnaire (ATAQ), Asthma Control Questionnaire (ACQ), and Asthma Control Test (ACT) (Lizzo & Cortes, 2023). In addition to identifying the level of asthma control, asthma can be classified depending on the level of asthma severity. These severity levels include mild intermittent, mild persistent, and severe persistent. Furthermore, asthma is classified based on the level of symptom control, ranging from well-controlled, not-well controlled, and poorly controlled (Lizzo & Cortes, 2023). These different classifications are used to determine the medications needed and used to help create the patient's asthma action plan which outlines their treatment plan (Lizzo & Cortes, 2023).

Significance

While children diagnosed with asthma may regularly seek care from a healthcare provider, the literature has shown that only 50% of children properly adhere to their prescribed treatment plan which can lead to an increased risk of complications from this condition (Wong & Morton, 2021). Furthermore, it was publicized that adolescents have lower treatment adherence than younger children, which is why this project focuses on the adolescent population as this age group begins to learn how to be involved in understanding and managing their health condition (Trojanowska et al., 2022). Literature has shown that adolescents approve of technology as a method to help manage their asthma and are interested in receiving additional educational materials related to their diagnosis. Specifically with asthma, 44.43% of a study population had reluctance to take daily medication and 16.67% of the population also had difficulty using the prescribed inhaler, both serving as inhibitors to proper treatment adherence (Trojanowska et al.,

2022). Therefore, the purpose of this DNP scholarly project is to design a virtual educational program aimed at adolescents diagnosed with asthma to better inform them about the disease, the importance of proper administration of treatment, and begin to increase their responsibility in their care.

Clinical Questions

1) What is the essential content - knowledge, skills, attitudes - that is required when developing a virtual educational program for adolescents with asthma?
2) What digital learning tools are age-appropriate for adolescents when designing a virtual educational program for adolescents with asthma?

Project Aim

The aim of this DNP scholarly project is to design an age-appropriate virtual educational program for adolescents with asthma.

Project Objectives

1) Identify the essential content - knowledge, skills, attitudes - that is required when developing a virtual educational program for adolescents with asthma.
2) Explore digital learning tools that are age-appropriate for adolescents.
3) Design an age-appropriate virtual educational program for adolescents with asthma.

Project Assumptions and Limitations

One limitation of this program design is that not all adolescents have access to technology to complete this virtual education program. Another limitation is that since this is a virtual program, the educational content provided is not individualized to the patient and provides little opportunity for the adolescents to ask questions, if not in contact with their

healthcare provider. Additionally, it is assumed that the adolescents who are accessing this program have a basic understanding of navigating website pages and can click through the prompted steps as a part of the education program and can comprehend information provided at an adolescent educational level. These limitations are further stated in Table 1.

Table 1
SWOT Analysis

Strengths: • Designed at an appropriate academic level for adolescents aged 10-14 years • Interactive design to engage participant • Contains elements to evalute understanding of material • Quality of resources used	**Weaknesses:** • Asthma therapy is individualized for each patient depending on their particular needs and triggers and the module is not personalized to each patient
Opportunities: • The educational module can be implemented in pediatric primary care offices and asthma specialist offices • Increases partnership between healthcare provider and patient	**Threats:** • Changes in the pediatric asthma guidelines would require updating the information contained in the module • Computer or tablet device is needed to access module

Conceptual Framework

The Health Belief Model was created to aid in understanding an individual's health behaviors and is used to model health promotion and disease prevention programs. This model is composed of six pillars: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy as shown below in Figure 1 (The Health Belief Model, 2022). Due to the complex nature of asthma management, this model helps to provide insight into how adolescents view their diagnosis of asthma and what may be contributing to any decreased treatment adherence they may have. Additionally, application of this model can be used to identify specific targets of where strategies and additional educational

measures can be implemented to improve the patient's adherence to the treatment regimen as prescribed by their healthcare provider.

The six components of this model can be applied to adolescents diagnosed with asthma as shown below in Figure 2. Perceived susceptibility is defined as the individual's perception of the risk of acquiring the disease and perceived severity is how the individual perceives the severity of leaving the disease untreated (Health Belief Model, 2022). For example, a patient may have differing ideas of the level of severity asthma can have and the consequences it can create when left untreated. An individual's perception of the effectiveness of treatment is known as the perceived benefit (Health Belief Model, 2022). Perceived barriers include obstacles the individual has to overcome when treating the disease, such as side effects of medications, time needed to attend follow up appointments, lack of understanding, or the cost of treatment. Cue to action is the catalyst needed to accept a recommended health action (Health Belief Model, 2022). This could be demonstrated by an adolescent experiencing distressing symptoms such as wheezing, shortness of breath, or gaining encouragement from family members to seek improved treatment. Self-efficacy is the individual's confidence to successfully perform a behavior, such as proper inhaler administration (Health Belief Model, 2022). Incorporating the health belief model into the proposed intervention to improve adolescent treatment adherence can help to convey the consequences asthma can have on one's health. Additionally, the health belief model is useful in both identifying and reducing barriers that are obstructing patients from having increased rates of treatment adherence (Health Belief Model, n.d.). Creation of a virtual education module aimed at adolescents will aid in explaining to them what asthma is, the types of medications commonly used, and the importance of taking their medications as directed by their healthcare provider. Furthermore, to encourage self-efficacy, a portion of the online modules will be designed to

teach adolescents how to properly use their inhaler and feel confident administering their medication as they begin to become more independent and involved in their care.

Figure 1

The Health Belief Model (Urich, 2017)

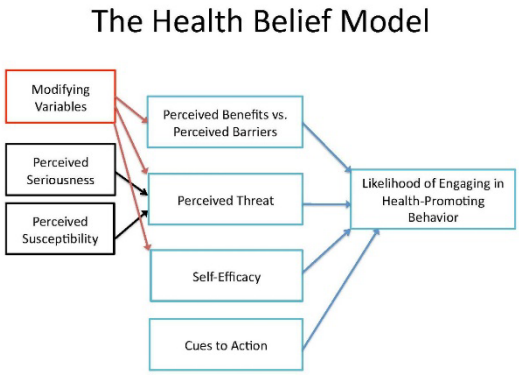
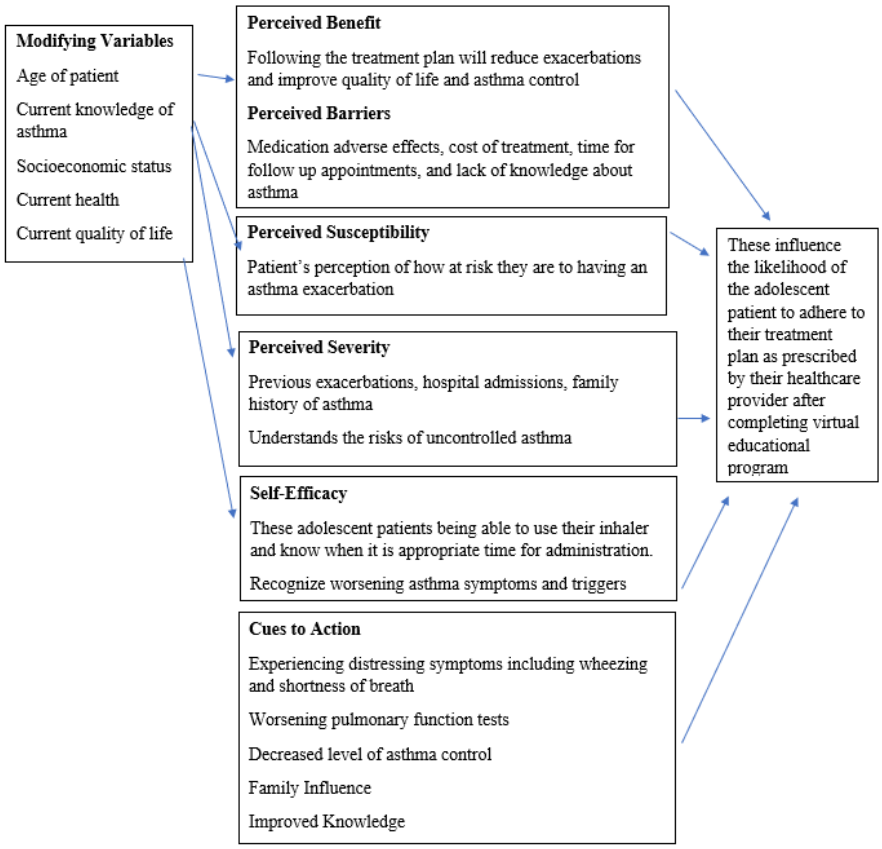


Figure 2

The Health Belief Model Construct Applied to Adolescent Asthma



Literature Review

Pediatric asthma is a chronic condition that affects over 8.4% of children in the United States (Lizzo & Cortes, 2023). With careful management asthma can be controlled, but it can also fluctuate into periods of exacerbation. These exacerbations can lead to approximately 2 million emergency room visits, 10 million outpatient visits, and 100 million days of restricted activity (Asthma Triggers, n.d.). To help manage asthma and prevent these flare ups from occurring, pediatric asthma patients can be prescribed an array of medications depending on their level of severity of asthma. These can include both oral and inhaled medications. Additionally, patients can be prescribed a rescue inhaler, such as albuterol, or may be prescribed a daily inhaler for maintenance if they have severe asthma. While there are medications available to help patients manage their symptoms and healthcare providers create management plans, called asthma action plans, the patient's adherence rate to prescribed treatments is less than 50% in this population (Wong & Morton, 2021). This decrease in treatment adherence rate can lead to increased morbidity and mortality from this disease. It has been determined that an adherence rate of at least 75% is needed to greatly reduce asthma exacerbations (Wong & Morton, 2021). Furthermore, research indicates that in a pediatric asthma population, adherence is highest in pre-school ages, and decreases to the lowest point during adolescence which has the highest morbidity and mortality rate in pediatric ages (Wong & Morton, 2021). Previous reviews have analyzed factors contributing to non-adherence and evaluate different methods for improving treatment adherence. The purpose of this review is to identify areas where additional education is needed for pediatric asthma patients and their families to improve their understanding of treatments and treatment adherence as well as evaluate digital health interventions as a method for providing this education.

Synthesis of Literature

A literature search was conducted August 2023 through October 2023 across three databases: PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), and Cochrane Library. Keywords including (educational intervention) AND (treatment adherence) AND (pediatric asthma) were used, also (pediatric asthma) AND (adherence). The search results were narrowed down to only include articles published within the past five years (2019-2023) and the article needed to be focused on pediatric patients diagnosed with asthma. From the generated literature search, 136 articles were found, and 9 are included in this review. The selected articles were appraised using the appropriate Critical Appraisal Skills Program Checklists (CASP), three themes emerged: 1) asthma education is related to levels of treatment adherence, 2) the need for increased instruction on medication administration, and 3) the use of digital platforms to aid in managing asthma.

An additional literature search was conducted March 2024 using the PubMed database using keyworks including (adolescent asthma) AND (adherence), also (adolescent asthma) AND (treatment). This search resulted in an additional 3 articles that focused on adolescent self-efficacy and responsibility impacts asthma control, the need for improving adolescent knowledge of asthma medications, and asthma education can lead to greater discussion between the patient and the provider.

Asthma Education Related to Treatment Adherence

Managing pediatric asthma can be difficult for patients and their understanding of the disease and associated treatments can affect their adherence to treatment and thus level of asthma control. Treatment adherence is a broad term, but encompasses patients attending scheduled follow up appointments, administering medications as prescribed by their healthcare provider,

and committing to the medical recommendations made (de Araújo Gueiros Lira et al., 2023). Not adhering to the treatment plan can be classified as being intentional, or non-intentional. In intentional non-adherence, this is when the prescription is understood, but not followed in entirety (de Araújo Gueiros Lira et al., 2023). Conversely, non-intentional non-adherence is when the patient forgets, misunderstands, or does not properly perform medication administration (de Araújo Gueiros Lira et al., 2023). These aspects of non-adherence become important since only half of children with asthma are determined to have acceptable control of their symptoms (O'Connor et al., 2023). It is important to consider that there are many factors contributing to non-adherence including personality, peer group influence, health education, consultation with the doctor, understanding the disease and the validity of therapy, and simplicity of the treatment with appropriate motivation (Trojanowska et al., 2022). Increased partnership between the pediatric patient and their family with the healthcare team can help to emphasize the importance of proper management of asthma and the need for improved adherence to treatment plans. Furthermore, it had been demonstrated that parents who understand the benefits of treatment are more likely to follow the prescribed treatment plan which highlights the need for increased use of educational materials in this pediatric population (Trojanowska et al., 2022). Furthermore, in treatment adherence studies, educational interventions were proven to be most effective when performed soon after the initial diagnosis of asthma (Wong & Morton, 2021). One study showed that when the participants were given the opportunity to attend an educational program in addition to receiving their usual asthma care, their adherence rates were as high as 80% whereas the control group had a 60% adherence rate (Koumpagioti et al., 2019). The same study also indicated that easy to understand educational content helps to improve treatment

adherence in patients (Koumpagioti et al., 2019). Good treatment adherence is correlated with a treatment benefit in patients who have greater than 75-80% adherence (Kaplan & Price, 2020).

In addition, asthma requires careful monitoring of symptoms and proper medication administration to maintain periods of adequate symptom control. The adolescent age period is often when these individuals begin to become responsible for partaking in managing their health. One study examined the extent to which adolescent asthma management self-efficacy, outcome expectations, and asthma responsibility were correlated with asthma control and overall quality of life. This study concluded that adolescents with higher reported asthma management self-efficacy were significantly more likely to have better controlled asthma and overall quality of life (Sleath et al., 2023). This demonstrates the need for healthcare providers and parents to work with adolescents in improving their self-efficacy in managing their asthma. Furthermore, this highlights the importance of healthcare providers giving proper education at an appropriate complexity level for the patient to promote improved adherence and accuracy of medication administration.

Instruction on Medication Administration

Pediatric asthma treatment plans often require administration of medications, whether administered as an oral or inhaled formulation, or both. One domain of where clarification is needed is proper inhaler administration. O'Connor et al. (2023), demonstrated that 40-98% of children with asthma do not use their inhalers correctly. This poses a need for healthcare professionals to provide further instruction and demonstration of inhaler usage and to check the patient's understanding of the proper use of the inhaler. This is applicable to pediatric patients who may need assistance in administering their inhaler and even though they may be administering the medication at the correct times as prescribed, they may be administering the

inhaler improperly, leading to a different amount of medication being administered. However, it was found that between 35-85% of healthcare providers do not properly educate patients on inhaler devices and cannot properly demonstrate the use of an inhaler device (Kaplan & Price, 2020). Aside from inhalers, other medication concerns are factors for decreased adherence to prescribed treatment. It was found that patients did not understand the rationale for administration of glucocorticoids, had reluctance to take medications every day, and feared adverse effects from the medication (Trojanowska et al., 2022). Fear was a common element discussed across the reviewed articles and it was determined that the fear related to the medication was due to a lack of knowledge about asthma and the management of asthma (Trojanowska et al., 2022).

Previous studies have indicated that as adolescents get older, their adherence to asthma controller therapy decreases (Frey et al., 2023). One potential reason for this is that adolescents are gaining responsibility but are not gaining the appropriate knowledge to accompany that responsibility. One study further explored this concept by having adolescents identify asthma medication on a chart and describe when it should be used and compared these answers to the adolescent's-reported adherence, symptoms, and healthcare visits. The study concluded that the adolescent's treatment adherence was increased when the adolescent could properly identify the medications (Frey et al., 2023). Furthermore, at follow up visits, the likelihood that the adolescent properly used their controller medication increased from when first measured at baseline before the intervention. This would be applicable to use in both controller medications, as well as rescue medications. This study used methods of teach back, and coding controller medications and rescue medications with color coded stickers (Frey et al., 2023). This study

provides further information on why the adolescent population has a need for increased asthma education to improve their overall treatment adherence.

These concerns pose opportunities for additional education to be provided and for healthcare professionals to spend extra time informing patients of their medications to help provide rationale for the prescribed treatment plans. The need for additional asthma education provided to patients is evident and the use of digital technologies is one way this education is being provided.

Use of Digital Platforms for Adolescent Asthma Education

Healthcare provider to patient discussions and relationships are imperative in providing clear communication on treatment plan and overall education. communication is important to provide easy to follow instructions on medications, such as proper inhaler administration. One study evaluated the impact of watching an educational asthma video before their visit and how it affected the discussion the patient then had with the provider during the visit appointment. The study concluded that more asthma trigger areas were significantly more likely to be discussed and providers gave more education during the visits where the adolescent watched the educational video before the appointment, and when the adolescent asked one or more questions (Sleath et al., 2021). This study continues to highlight the importance of provider-patient communication and how providing educational tools to patients helps to foster further asthma educational development and increased knowledge.

Technology is becoming increasingly incorporated into healthcare and is heavily integrated with asthma care. Many researchers have investigated the efficacy of using digital platforms as a resource for patients diagnosed with asthma. For instance, Weinstein et. al (2019), explored the usage of an internet application to run an asthma adherence pathway, and

demonstrated it was effective in promoting adherence and helped to improve levels of asthma control. Another example is creation of an asthma specific website for parents to have as a resource for their child's asthma and parental satisfaction of the website was measured and concluded that the parents were satisfied with the information the website provided and stated the information was beneficial in aiding them with the care of their children (Ansari et al., 2019). Additionally, studies have explored other emerging asthma technologies including mobile applications to track asthma symptoms and medications, medication reminders, electronic monitoring devices, and serious video games (video games designed for medical purposes) (Ferrante et al., 2021). The development of these technologies and the use of technology by children presents a unique platform to deliver education. Research has shown that the age of introducing technology to children is dropping and that smartphone and tablet related apps are appropriate for pediatric asthma patients (O'Connor et al., 2023). Furthermore, other systemic reviews have demonstrated that healthcare education delivered through smartphone or tablet applications results in outcomes of improved knowledge, adherence to medications or treatment, and improved clinical care (O'Connor et al., 2023). One study also demonstrated that brief verbal instruction coupled with a brief instructional video was shown to be more effective than brief instruction alone (Wong & Morton, 2021). While these applications have demonstrated success, researchers have cited the importance of using a co-design process with the target population to improve the success rate of using the application properly (O'Connor et al., 2023). Additionally, the effectiveness of the educational module and the patient's acceptance of the intervention are impacted by the perceived usability of the digital intervention which is important to consider when designing these modules (O'Connor et al., 2023).

Practice Implications

Due to the chronic nature of asthma, it is important that adolescent patients gain an understanding of asthma's disease process and the treatment options available as they begin to become more independent and manage their asthma. As mentioned earlier, proper adherence to treatment affects level of asthma control and thus mortality and morbidity of asthma. This highlights the importance of healthcare professionals fostering a strong provider-patient relationship to promote communication and trust with patients. As a healthcare provider, it is important to fully explain medications and the reasoning behind the importance of proper medication administration and it is essential for healthcare providers to provide the proper tools to patients to aid the patient's chance of success. This instruction can be supplemented through digital programs and is a method healthcare organizations should consider incorporating for adolescent patients.

Gaps in the Literature

Based on the literature reviewed, there are several points where future research is needed. One area is to evaluate the long-term effects of digital health interventions and assess the patient's retention of information over time. This would help provide further clarification of the effectiveness of the intervention but also give feedback on how often the patient would need to participate in an educational intervention to retain the same information benefit. Additionally, future research is needed to explore how to make these digital interventions accessible to individuals without easy access to technology and to account for other social determinants of health.

Setting

Population/Sample/Setting

The population for this project will be adolescents. This project will focus on adolescents between the ages of eleven to fourteen who have a diagnosis of asthma. The project will be designed via a virtual platform so participants can access the project materials through a web browser on a computer or on a mobile tablet.

Inclusion/Exclusion Criteria

Information included in this educational module must be applicable to the pediatric population and must relate to the treatment of asthma. An additional inclusion requirement is that the information must be retrieved from a reliable source. Data will be excluded from this educational module if it is not approved for use in a pediatric population.

Methods

Information on asthma treatment guidelines, medication administration, and asthma symptoms was collected to provide insight into the content needed for the educational program. This information was collected from PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), and Cochrane Library databases accessed through Emory University Libraries. The quality of the data was assessed by using the appropriate Critical Appraisal Skills Program Checklist (CASP). This information was further analyzed through a literature review. Common themes were developed where additional asthma education is needed. These themes were integrated into a virtual educational module with the assistance of the School of Nursing's instructional design team. The educational module is created to be at an appropriate developmental level for the target sample adolescent population of 10-14 years old.

Meetings with a member of the instructional design team and faculty lead were held biweekly to develop this program using the Storyline design software. Program development began with an outline of goals for students to have when completing the educational module. Once the goals were determined, the creation of the specific content was written. Development of tools used to perform knowledge checks during the educational module were completed in collaboration with the instructional design team. The knowledge checks are designed to encourage interaction with the educational module and help to reinforce the presented content.

Resources

This project used the design software Storyline provided by the instructional design team at the School of Nursing. Additional resources include the project faculty team lead, Dr. Beth Ann Swan and other School of Nursing faculty. Access to external literature sources is provided by Emory University Libraries.

Identification of Stakeholders and Site Support

Stakeholders for this project include adolescents with asthma and their families, primary care healthcare providers, pediatric asthma specialists, and the School of Nursing's instructional design team. The interests of these stakeholders are shown below in Table 2.

Table 2

Stakeholder Analysis

Stakeholder	Interests	Estimated Project Impact	Priority
Adolescents with Asthma	Better treatment outcomes and improved quality of life. Better understanding of asthma and ways to manage symptoms.	High	1
Primary care healthcare providers	Can use module to better educate their patients on treatment plan and expected outcomes of treatment in conjunction with other education provided during healthcare visit.	Medium	2
Pediatric asthma specialists	Can use module as an additional method of education to adolescent patients being treated by an asthma specialist.	Medium	2
Emory University Instructional Design Team	Produce a quality educational module designed for adolescent engagement.	Medium	2

Protection of Human Rights

A Non-Human Subject Research Determination Form was submitted, and this project was deemed not human subject research as it is an educational activity.

Plan for Dissemination to Key Stakeholders

Creation of this virtual educational module can be used to inform adolescent patients about asthma and improve their understanding of the treatment. This aids in improving their treatment adherence, as it has been demonstrated that lack of education regarding asthma treatment contributes to improper management of asthma treatment (Trojanowska et al., 2022). Furthermore, studies have indicated that treatment adherence rates need to be at 75% for

treatment to be considered successful, but nonadherence rates in adolescent patients are as high as 50%, thus there is a need for this module to be provided to adolescent patients with asthma (Kaplan & Price, 2020; Wong & Morton, 2021). The educational module will be shared with key stakeholders via a web address link and showcased through a presentation. Stakeholders will be able to interact with and complete the educational module. While at this phase of the project, the module is not being formally implemented into healthcare practices or used with patients, informal written or verbal feedback will be collected and taken into consideration when making modifications to the program. Use of technology in providing education to patients has been shown to be effective, but a potential barrier to dissemination can be lack of access to the internet (Radhakrishnan et al., 2022).

Timetable

	Jan 2024	Feb 2024	March 2024	April 2024	May 2024
Begin data collection by conducting literature search across databases	X				
Meet with the Instructional Design Team to begin discussing educational module design.	X				
Finish data collection and outline content for educational module.	X	X			
Meet with the Instructional Design Team to continue working on educational module design		X			
Continue integrating content into educational module		X	X		
Meet Adarsh from the Instructional Design Team to continue working on educational module design			X		
Receive draft of educational module			X		
Share current version of educational module to Emory University faculty for any edits				X	
Meet with Adarsh from the Instructional Design Team to continue developing the educational module				X	
Make any necessary modifications to				X	

educational design module					
Finalized educational module					X

Results

The completed 5-minute module guides an adolescent through an explanation of asthma. The module begins with a visual demonstration of how asthma affects the lungs and airway. It continues into an interactive scene of finding hidden items that may act as triggers to asthma exacerbations including pollen, pet hair, dust, exercise, smoke, viruses, and mice. Next, the module introduces albuterol and reinforces how this is a rescue medication. The module then transitions into a drag and drop activity of how to properly administer an albuterol inhaler along with voiceover instruction. The module concludes with reminders for the adolescents such as verbalizing when they feel their symptoms are not being controlled and remembering to bring their inhaler with them to different activities. Lastly, the module finishes by providing external links to additional resources for parents and adolescents.

Discussion and Conclusions

When developing this program, the first objective was to decide on the specific content to be included in the education. The material presented in the module was decided based on the findings synthesized from a literature review conducted across several databases. This provided information on what topics previous studies have concluded are commonly misunderstood by patients and their families and where further education is needed. Furthermore, a literature review also provided insight into comparing different formats of education administration and evaluated the efficacy of using an electronic platform.

The next objective was to present this information in a format that was engaging and age appropriate for adolescents. Meetings were held frequently with the instructional design team at the School of Nursing to explore the Storyline software as a platform for the creation of this module. Additionally, different types of interactive scenes and interactive knowledge checks were sampled to create an engaging experience for adolescents. The third objective was met by providing age-appropriate education. When writing the script for the module, content was presented using age-appropriate vocabulary with no medical terminology used as well as incorporating visual representation to demonstrate ideas.

While the objectives of this project were met and this project focuses on providing education that is applicable to most adolescent patients with asthma, individuals have varying degrees of asthma severity and require different treatments that were not covered in this module. It was learned that in order to reach a larger audience, the module needed to contain information that is relevant to most people diagnosed with asthma. The short acting bronchodilator, albuterol, is a medication given to individuals diagnosed with asthma at all levels of severity which is why the module provided detailed instruction on albuterol administration, but future iterations of this module could expand to providing more education on inhaled corticosteroids that act as controller medications for individuals with moderate or severe persistent asthma.

Implications and Recommendations

Findings from the literature review provided insight that only 50% of children properly adhere to their asthma treatment plan, making these individuals at an increased risk for asthma exacerbations (Wong & Morton, 2021). Most of the reasons contributing to this lack of adherence stemmed from reluctance to take daily medication and difficulty using the prescribed inhaler (Trojanowska et al., 2022). This module has the capability to improve both of these

barriers to optimal treatment adherence since it helps explain the nature of asthma complications and provides interactive visual demonstration along with verbal explanation of the proper way to administer an inhaler. This module can be presented to patients on a tablet or device that can access the internet. One method of dissemination to patients is during the office visit, when the patient is given a diagnosis of asthma. It helps provide reinforcement to the education the provider has already given the patient and can ensure that the patient understands the instructions by completing the interactive knowledge checks incorporated into the module. Additionally, this aids in addressing the claim that healthcare providers did not properly educate patients on inhaler devices and the proper administration of an inhaler (Kaplan & Price, 2020). This module aids in increasing one's self-efficacy to manage their asthma and the improved knowledge serves as a cue to action to adhere to the prescribed treatment plan. Doctorly-prepared nurses can incorporate this program into their visits with adolescents and help improve provider-patient communication with the goal of improving the patient's understanding thus promoting better treatment adherence and lessen the morbidity of asthma.

Evaluation of the Process and Experience

Completing the DNP project course series was beneficial in providing further exposure to evidence-based research and practices. This course was a great opportunity to combine several skill sets learned over the course of many semesters into a project of interest. This experience laid the foundation to pursue additional research and evidence-based projects as a nursing leader in pediatrics.

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