Asthma Management in an Urban Community Health Clinic: A Guideline Approach

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In partial fulfillment of the requirements for the Doctor of Nursing Practice

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Date of Submission: January 7th, 2020

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Abstract

Asthma exacerbations are one of the most common causes for walk-in health care visits in the community healthcare setting. In the United States, there are approximately 1.8 million asthma-related visits to the emergency department each year. Appropriate initial treatment of patients with asthma could reduce acute exacerbations, improve quality of life, and potentially reduce the number of asthma-related complications including death. This quality improvement project involved the development and implementation of an Asthma Exacerbation Protocol based on The National Asthma Education and Prevention Program recommendations. The protocol was created to guide medical providers and staff in evidence based management of adult asthma. The interventions of this DNP project focused on documenting education for asthmatic patients, prescribing controller medications for all patients with a diagnosis of moderate persistent asthma or greater and performing spirometry at appropriate intervals. Providers and staff were educated on the protocol. Retrospective pre-implementation data was compared against post-implementation data collected from chart review (N=30). Analysis of the data showed that after implementation of the Asthma Exacerbation Protocol, spirometry assessment rates increased from 16% to 83%, prescriptions of controller medications increased from 53% to 93% and asthma education documentation went from 46% to 96%. The analysis revealed that greater than 75% improvement in all areas was achieved. This Asthma Exacerbation Protocol may serve as a guide to improving evidence based practice in adult patients with moderate to severe asthma.

Background

Asthma is a chronic inflammatory lung disease that causes episodes of wheezing, coughing, and feelings of breathlessness (National Committee for Quality Assurance [NCQA], 2018). The effects of asthma can vary significantly, and symptoms may be absent between exacerbations (Al-Moamary et al., 2016). The symptoms of asthma have been well documented and researched for over two and a half millennia, and yet millions of individuals continue to suffer from this condition (Allergy and Asthma Medical Group & Research Center, 2018). When not properly controlled, asthma has been associated with significant limitations on all aspects of life including physical, social and professional (Nunes, Pereira, & Morais-Almeida, 2017). The number of individuals diagnosed with asthma has continued to rise substantially over the past decade despite extensive research and a wide array of medications available. Improper control can severely limit an asthmatics life which may lead to hospitalizations and death. According to the CDC, there are over 3,000 asthma related deaths in the United States each year (Office of surveillance, epidemiology, and laboratory services [OSELS], 2016). On average approximately 1/3 of adults miss work each year due to asthma symptoms and exacerbations (OSELS, 2016).

The original assumption about asthma was that it was a disease of the airways smooth muscle, which drove the development of bronchodilators (Allergy and Asthma Medical Group & Research Center, 2018). As research continued, it was discovered that inflammation had an underpinning in asthma, which prompted the development of controller therapies (Centers for Disease Control and Prevention [CDC], 2018). Invention of controller medications has drastically improved the lives of asthmatics but, there is still a need for more education and interventions as prevalence and incidence rates continue to remain high (Boulet, 2015).

Currently, there is no cure for asthma and the goal is to maintain control of symptoms. Several studies have shown that most patients can achieve control regardless of the level of severity (Papaioannou et al., 2015). Asthma guidelines have distinguished asthma severity from asthma control and the current recommendation is to establish an appropriate treatment based on control rather than severity (Papaioannou et al., 2015). Once control of asthma has been achieved then treatment should be adjusted to maintain control on the lowest effective dose of medications. Despite taking prescription medications, many patients will remain uncontrolled (Price, Bjermer, Bergin, & Martinez, 2017).

Primary care providers play an essential role in improving the quality of life for asthma sufferers by attempting to control symptoms. Asthma is one of the most common health problems in the United States and without proper control can significantly decrease quality of life.

Problem Statement

Asthma is a treatable condition that affects more than 25 million people in the United States (NCQA, 2018). The setting for this DNP project is an urban community health care center in the state of Nevada. The mission of a community health care center is to deliver high-quality primary health care services in geographic locations where economic or cultural barriers may limit access to health care services (Health Resources & Services Administration [HRSA], 2018). This project will focus on improving the quality of care for patients with asthma; managing asthma with appropriate medications and interventions may significantly improve the quality of life for asthmatics. The National Asthma Education and Prevention Program (NAEPP) oversees the development of national guidelines and established that spirometry, proper use of medication, and providing education is essential in the care of asthmatics (National

Heart, Lung, and Blood Institute [NIH], 2018). A diagnosis of asthma is only confirmed when spirometry shows obstruction and reversibility by an increase in FEV1 of >12% after use of a bronchodilator (The National Asthma Education and Prevention Program [NAEPP], 2017). Despite national guidelines many patients at this community health care center have no spirometry documented in the electronic health record (EHR). The NAEPP provides specific recommendations on the use of daily inhaled corticosteroids (ICS), routine spirometry every 1-2 years, and asthma education at every follow up visit (NAEPP, 2017). Currently, providers are managing asthma on an individual basis with no standardization at this community health center. In review of this community health care center's EHR, many patients have not been prescribed an ICS despite a diagnosis of persistent asthma and documentation of refilling rescue inhalers at least once a month. Most patients have no education documented in their EHR within the past year. An asthma treatment protocol which includes a standard set of guidelines and patient education recommendations for practitioners to use will assist in the prevention of acute asthma exacerbations and improve quality of life for patients regarding treatment and self-management (NCQA, 2018). It is incumbent upon health care providers in the primary care setting to integrate guidelines for asthma management and provide patient education regarding disease self-management into their practice

Purpose Statement

The aim of this Doctor of Nursing practice (DNP) project is to guide providers in implementing an asthma treatment protocol (ATP) for adults in an urban community health care clinic. This guideline will improve accurate diagnosing, care practices, and medication management. The overarching aim of this project is to improve the use of spirometry, increase

the use of controller medications, and provide patients with education for asthma self-management.

Project Question

In adults with asthma, does the implementation of an ATP, compared to no standardized protocol, improve use of spirometry, prescribed controller medication, and documentation of education?

P (Population) = Health care providers

I (Intervention) =Asthma treatment protocol

C (Comparison) = No asthma guideline

O (Outcome) = Measure provider compliance to protocol. Specific measures will include the following: controller medications will be prescribed to asthmatics with a severity level of moderate-persistent or greater and have documentation of education in the EHR.

T (Time) = Over a period of four weeks

Project Objectives

The objectives for this project will be completed within the timeframe of the DNP program and will be implemented as follows:

1. Develop an ATP for the medical staff for self-management of asthma in the primary care clinic.
2. Educate providers regarding implementation of the ATP prior to implementation of the DNP project.
3. Evaluation of providers' compliance with the ATP via chart audit.

4. There will be a 75% improvement of patients with a severity level of moderate persistent or greater being prescribed a controller medication.

5. There will be a 75% improvement of documentation of education on asthmatic's EHR.

6. There will be a 75% improvement of a documented spirometry in the EHR.

Literature Search

A literature search was conducted, and the following databases were utilized in order to find the most accurate evidence: Cochrane, PubMed, CINAHL, Medscape, Google Scholar, and governmental agencies such as Centers for Disease control and prevention, National Institutes of Health and the Agency for Healthcare Research and Quality. There were over 15,000 articles returned using the key words: asthma, guidelines, evidence-based guidelines, adult, treatment, patient education. The search criterion was narrowed down by first including studies that were conducted between 2013 and 2019. Studies selected included cohort studies, randomized controlled studies and meta-analysis and had to include full text. The inclusion criteria reviewed in the selected studies addressed asthma management guidelines, specific diagnosis and treatment, asthma measures, primary care clinic, and patient education. Articles that were excluded included any co-morbidity other than asthma, any articles that were not peer reviewed, research based, or only had abstracts available and not full text articles. Articles were excluded if they included a pediatric population or were in any setting other than outpatient clinics. Articles that were non-English or more than five years old were excluded. There were 36 eligible articles and the 10 most recently published articles were selected for appraisal and review.

Literature Review

The literature confirms that asthmatic patients benefit, and outcomes are improved when treating patients in a step wise approach, with a combination of pharmacotherapy and non-pharmacotherapy methods (Wong, Manley, & Stettin, 2017). Pharmacotherapy interventions may include rescue inhalers and corticosteroids, while non-pharmacotherapy interventions may include patient education, monitoring symptoms, and avoiding triggers (Wong, Manley, & Stettin, 2017). In one cluster randomized controlled study, implementing a step wise approach with prescribing controller medications along with routine pulmonary function testing showed significant improvement of asthma control and assessment of asthma level of control compared with the control (Mold, et al., 2014). The primary objective with asthma is to stop attacks from occurring before they begin. The American Academy of Pediatrics (AAP) recommends key points when preventing asthma attacks. These include avoiding any known triggers, implementing a written asthma action plan that includes proper use of medication and how to recognize worsening symptoms and adjusting medications as needed (American Academy of Pediatrics, 2016).

Significance of Evidence

Asthma currently affects more than 300 million individuals globally. Despite medications readily available the prevalence of asthma continues to rise (Global Initiative for Asthma, 2016). The disability-adjusted life years (DALYs) is a screening tool used to measure health disparities in populations. It provides a metric analysis that can estimate which diseases contribute to a loss of health in a given population (World Health Organization [2019], WHO). It is estimated that 13.8 million disability-adjusted life years (DALYs) are lost every year due to

asthma, and this represents 1.8% of the overall disease burden worldwide (Global Asthma Network, 2018). Asthma ranked in the top 15 health on conditions that caused the most years of life lost (Health Data, 2016). In one cohort study conducted results showed that the use of SABAs was related to increased airway hyper responsiveness, increased mortality, poor control of symptoms, and the overuse of healthcare (Belhassen et al,. 2016). Despite recommendations and well documented adverse health outcomes with overuse of SABA, data suggests that the overuse of SABA and underuse of ICS is still common practice (Global Initiative for Asthma [GINA], 2019). The goals of asthma management are to improve the quality of life, decrease the costs of medical care, and improve productivity.

Current Recommendations

An asthma management cycle can be utilized to control symptoms. This is an ongoing continuous cycle to assess, adjust treatment as needed, and review the response to interventions (Global Initiative for Asthma [GINA], 2019). In the assessment phase a thorough review of co-morbidities and risk factors are examined along with symptom control. Asthma goals are addressed during this phase and should include the values and culture of the individual. Current recommendations when treating asthma are to modify co- morbidities and reduce risk factors that would worsen asthma. The latest recommendation is that every patient with asthma be placed on an inhaled corticosteroid (ICS), even in patients with infrequent symptoms (GINA, 2019). Every patient should be prescribed a rescue inhaler (Johnson et al., 2016). The patient's response to interventions should be evaluated every time treatment has been adjusted. The response should address any exacerbations, side effects, lung function, and overall satisfaction of the patient (Pinnock et al., 2016).

The Centers for Disease Control and Prevention (2017) details the importance of providing every individual with a written action plan. Asthma action plans teach patients how to recognize symptoms before they become out of control. In a written action plan, patients are provided specific guidance on how to evaluate asthma and how to respond during times of exacerbation and emergencies (Centers for Disease Control and Prevention, 2017). One meta-analysis of randomized controlled trials and systematic reviews concluded that the implementation of asthma action plans that allowed patients to self-manage their symptoms had reduced hospitalizations and emergency room visits (Pinnock et al., 2016). The National Institutes of Health (NIH) recommends the use of Spirometry in diagnosing and routine monitoring of patients with asthma (National Institutes of Health, 2013). Common allergens that have been known to trigger asthma symptoms include tobacco, acid reflux, strong odors, perfumes, dust, animal dander, mold, pollens, stress, and weather changes. (American Academy of Allergy Asthma & Immunology, 2019). Identifying and avoiding any known triggers is also a vital component in the prevention of asthma exacerbations.

Current Management

The general principles when managing asthma are to improve symptoms and to reduce risk factors. It can be difficult to diagnosis asthma since lung function may be within normal limits during routine office visits. If the criteria for diagnosing asthma cannot be met, testing can be completed when symptoms are present or withholding SABA medications for >12 hours and then performing spirometry (Global Initiative for Asthma [GINA], 2019). If a patient reports frequent symptoms despite a normal spirometry, a trial of an ICS can be initiated, and then repeat spirometry within three months to ensure improvement (GINA, 2019). A normal spirometry result at the time of clinical presentation has posed a significant challenge in the diagnosis and

management of asthmatics (Kaicker, Dang, & D' Urzo, 2014). Objective findings can be difficult and therefore caring for asthmatics requires close monitoring. In a prospective multi-center cohort study of adult patients, with a current diagnosis of asthma, a diagnosis could not be clinically established in 33% of the patients who underwent a thorough history and physical and updated spirometry (Aaron, Vandeheen, Fitzgerald, & Ainslee, 2017).

Teach, Gill, Togias, Sorkness, Arbus, & Calatroni (2015) found that a significantly lowered exacerbation rate existed when a preventative corticosteroid was initiated compared with the placebo group in a randomized, double blind placebo controlled, multicenter clinical trial conducted. This is highly suggestive that initiating a preventative medication such as a corticosteroid is imperative when caring for asthmatics and beginning a protocol in the clinic. The use of short-acting beta agonists (SABAs) alone is no longer recommended even for patients with mild asthma (Global Asthma Network, 2018). SABAs provide quick relief of acute symptoms but are associated with lower lung function when used alone (Belhassen et al., 2016). In order to achieve best outcomes, a low dose ICS should be initiated as soon as a diagnosis has been confirmed (Global Asthma Network, 2018).

Pharmacological management is approached in a stepwise manner. This is when the dose of medications and the frequency of administration are increased when necessary and then decreased as soon as soon as control has been maintained (National Asthma Education and Prevention Program, 2007). An expert panel from the National Asthma Education and Prevention Program recommends that all patients be maintained on the least amount of medication to maintain control of symptoms (National Asthma Education and Prevention Program, 2007). Medications for asthma have two general categories. Quick-relief rescue inhalers, which are used to treat acute symptoms, and long term controller medications, which

are used to maintain control of the symptoms of asthma (US Department of Health and Human Services, 2007). The National Asthma Education and Prevention Program [NAEPP] (2007) have provided guidance on this stepwise approach to treatment. Quick relief medications include short acting beta agonists (SABAs), anticholinergics, and systemic corticosteroids. Medications that provide long-term control according to the NAEPP (2007) include corticosteroids, long acting beta agonists (LABAs), leukotriene modifiers, and immunomodulators. LABAs are not recommended as monotherapy due to the increased risk of severe exacerbations and the risk of disguising poorly controlled asthma (Global Initiative for Asthma. (2019). LABA medications may be added when patients are not well controlled on rescue inhalers and ICS medications. Leukotriene modifiers can be used as an adjunctive therapy with ICS medications when symptoms are not well controlled. Immunomodulators prevent binding of IgE to receptors on basophils and mast cells, such as omalizumab. This is typically used as an adjunctive therapy when patients have concurrent allergies and severe persistent asthma. This requires the prescribing clinician to be prepared and equipped to treat anaphylaxis (Global Initiative for Asthma. (2019).

Patient Education

Providing asthma education to patients is vital in the care of asthmatics. One cross-sectional study found that 40% of patients were not able to properly use an inhaler and more than 45% had no documentation of patient education in their chart (Al-Jahdali, Ahmed, Al-Harbi, & Khan, 2013). According to Boulet (2015), patients should be educated in essential skills which include the following:

- General asthma education
- Proper use of inhalers

- Written asthma action plans
- Use of peak flow meters or self-monitoring of symptoms
- Regular medical follow ups

Uncontrolled asthma is one of the top causes of emergency department visits and hospital admissions (Centers for Disease Control and Prevention, 2017). Proper use of inhalers and increased education may improve lung function, decrease the need for emergency department visits, and improve quality of life for patients (NCQA, 2018). Education must be tailored to each individual patient. A systematic review identified that patients preferred the use of the tell-back method, where they were asked to restate what they have learned in their own words (Van Boven, Ryan, Eakin, & Foster, 2016). The World Health Organization (WHO) has provided specific educational strategies to help with asthma management compliance. These include:

- Providing education at every visit,
- Receiving education from all members of the health care team,
- Teaching self-management, inhaler use, and environmental control, and
- Providing an individualized written action plan that the patient is an active partner

The goal of improving patient education is to optimize medical adherence and improve patient understanding of health care advice (World Health Organization [WHO], 2015).

Patient Referral

Despite advancements made in asthma therapy, a considerable number of individuals with asthma experience poor control of this disease (Bellanti, 2015). This difficult-to-treat asthma is a recalcitrant form characterized by insensitivity to medications. There were more than 3,000 asthma-related deaths in 2015 in the United States (Asthma, Allergy, & Immunology, 2019). A lack of appropriate management may significantly impact the quality of life for

asthmatics. Recommendations were given by the American Academy of Allergy Asthma and Immunology, on when to refer a patient to a specialist. Referral should be made whenever there is difficulty achieving or maintaining control of symptoms, if there are more than two systemic steroids being prescribed per year, any exacerbations requiring hospitalizations, or a diagnosis of moderate or severe persistent asthma (Children's Specialist in Pulmonology, 2015). Optimizing the referral process to a specialist would benefit asthmatics with unmet needs (Price, Bjermer, Bergin, & Martinez, 2017). It is important to include a process of referral when implementing an ATP for these patients when asthma control remains suboptimal.

Theoretical Framework

The Diffusions of Innovation (DOI) is a social science theory that originated in communication studies and attempts to explain how an idea gains momentum and diffuses through a social system or population (Appendix A). The result of the diffusion is that individuals, who are members of communities, learn a new idea or behavior (Mohammad, Poursaberi & Salahshoor, 2018). This is a process that involves adoption in which individuals learn new things, such as acquire new behavior or purchase new products. In order for adoption to take place, the individual must perceive the new idea, product or behavior to be innovative (Mohammad, Poursaberi & Salahshoor, 2018).

The history of Diffusions of Innovation can be traced back to 1903 when Gabriel Tarde the French sociologist plotted the S-shaped diffusion curve (Dearing, 2009). Through his book, The Laws of Imitation, Tarde explained the concept of diffusion as a societal-level phenomenon of social change (Dearing, 2009). Tarde’s perspective was the forerunner in determining the influence of diffusion on how societies and cultures progressed and changed. The book, Conflict:

The Web of Group Affiliations, highlighted the manner in which position within the social network affects an individual's reaction to innovation (Dearing, 2009). This was then followed by the research conducted by Ryan and Gross (1943) who introduced the different adopter categories that were later popularized by Everett Rogers.

Rogers developed this process and asserted that, initially, it is only a few who are always initially open to new ideas. These are the ones who adopt the new ideas. Rogers categorized people into five groups including innovators, early adopters, early majority, late majority and laggards (Rogers, 1983). The innovators are the ones who come up with ideas or concepts. Innovators spread the word about the product or behavior. The early adopters are opinion leaders within the communities (Rogers, 1983). Opinion leaders have a leadership role to play within the community. They are among the first to embrace change. The early adopters are aware of the need for and importance of change and, so, comfortable with the new ideas. The third category comprises of early majority (Rogers, 1983). These are rarely leaders but are receptive to change faster than the average person. The early majority need evidence of the working of the innovation in order for them to adopt it. The late majority are persons characterized by resistance (Rogers, 1983). They only adopt a new behavior or product once they feel that this has been tried by many people. Laggards are persons who are conservative and bound by traditions (Rogers, 1983). These people are skeptical to change.

The adoption of new ideas, products or behavior is not simultaneous within any social system. This is because there are some people who adopt innovation and ideas faster than others. Rogers states that there are four factors that influence the spread of a new idea. These factors include the innovation or product itself, the communication channels, social system and time (Rogers, 2002). The process of adoption of new idea or behavior depends mainly on human

capital and must be adopted on a wider scope in order for it to be self-sustaining. People who adopt an innovation early have different features from the late adopters. It is therefore important that the features of the target population be considered when promoting an innovation within this population (Zaoutis & Chiang, 2007).

Applicability of the Theory to Current Practice

The Diffusion of Innovation theory is applicable to current practice as it helps analyze how individuals adopt new ideas and behaviors. This theory can assist in determining preventive measures to control prevalence of diseases. Health care providers can implement this theory with patients to educate those regarding asthma and guide behavioral changes among other innovations that can be diffused to other members within the community (Dearing & Cox, 2018). This theory has been used to guide studies within the healthcare setting. One study conducted wanted to address potential barriers when implementing an asthma protocol. The Diffusion of Innovations theory was used to guide this study and was able to successfully bring forth barriers of implementation (Wahabi & Alziedan, 2012). These barriers revealed the importance of simplifying protocols and approaching perceived barriers in a multifaceted manner.

Major Tenets of the Theory

The Diffusion of Innovations theory has five main tenets including innovation, adopters, communication channels, time and social system (Rogers, 2002). Innovation is broadly described as any idea or behavior that is considered new by an individual or community and which may be adopted by the said individuals or community (Dearing & Cox, 2018).

Adopters.

Adopters are the units of analysis. Adopters are comprised mainly of individuals but may also include communities, hospitals, businesses and schools. For instance, community health

care centers may adopt new ways of managing asthma exacerbations. One of the features of adaptors is that they are courageous and do not fear investing in new products or approaches to doing things (Zaoutis & Chiang, 2007). The knowledge of the adopters helps in word-of-mouth advertising and promoting the new ideas, behaviors or concepts and increases the rates of adoption (Zaoutis & Chiang, 2007).

Communication channels. Communication channels allow for the transfer of information from one unit to another within the adoption system. Communication channels can be divided into two: mass channels and interpersonal channels (Rogers, 2002). Mass channels can work to better create initial knowledge of innovations while interpersonal channels are effective in influencing individuals towards adoption of innovation (Rogers, 2002). In most instances, individuals evaluate innovation based on the subjective experiences of their experiences.

Time and social systems. The passage of time is important and necessary for any innovation to be adopted. Adoption takes time and cannot occur simultaneously for all individuals. The social system comprises of different factors including mass media, government and consumers, opinion leaders and the relationships that individuals have within themselves (Zaoutis & Chiang, 2007). These internal and external factors have different influences on individuals and clinics. Opinion leaders play a significant role in educating and providing in-depth information (Zaoutis & Chiang, 2007).

Application of Theory to the DNP Project

The Diffusion of Innovation theory can be applied directly to this DNP project. The asthma guidelines that will be implemented are the innovations, the healthcare professionals are the adopters and the community healthcare center is the context or the environment in which this ATP will be implemented. Implementation will be addressed though factors which influence

innovation, attributes of the ATP, the adopters characteristics, and the environmental factors which constitutes the complex environment of the health care center as well as the patient as the stakeholder.

The Diffusion of Innovation model can be used in management of asthma among individuals and communities and will be used to guide the development of asthma guidelines. The potential adopters of the innovation in this case are health care providers. The clinicians will educate patients regarding asthma, proper use of medications, and reducing risk and exposure to asthma causing agents at every visit. The study by Valente, Dyal, Chu, Wipfli & Fujimoto (2015) conducted on an asthma population states that being exposed to adopters increases the rate of diffusion of the behavior or idea.

The relative advantage of an innovation is the degree to which an idea is considered better than the previous idea. For this DNP project, behavioral approaches can be considered to help reduce exposure to asthma causing agents. These are cost-effective and do not result in negative power balance between clinicians and patients. From the perspective of this framework, an innovation should be compatible. That is, it should be consistent with current values, past experiences and meets the needs of adopters (Rogers, 1983). Providers will guide the behavior of patients through education. As asthma protocols are implemented staff members will begin to adopt this innovation to improve patient outcomes.

Complexity measures the degree to which an innovation, idea or behavior is perceived as difficult to understand (Rogers, 1983). Preventive services, such as preventing asthma exacerbations may not be adopted quickly in spite of the potential health gains that they bring to patients if not presented in an easily understandable manner (Collins et al., 2017). In addition, care should be taken as attempts to intervene at the primary level to offer preventive measures

may be resisted by patients, such as smoking cessation (Harver & Kotses, 2010). If there are significant time constraints on providers, then reducing asthma symptoms and providing thorough education may become more challenging. This theory specifically addresses these time constraints and will help guide this project with a goal of providing easy to understand guidelines to ease this burden.

The intervention will be implemented and then modified if needed. This allows clinicians a chance to evaluate the implementation and determine whether it is acceptable (Rogers, 1983). The implementation of this ATP will be guided by the Diffusions of Innovation theory and led by a multidisciplinary team that is comprised of health care providers, a team lead nurse, and staff medical assistants. The medical assistants will be tasked with the responsibility of performing spirometry testing, instructions on proper use of inhalers, and updating medication and allergy lists. Clinicians will evaluate the symptoms of asthma, provide education, reinforce asthma action plans and prescribe medications in a stepwise process. Through this, the team will receive continuous feedback on the progress of the patients who are being followed.

This theory encourages making interventions visible to people (Rogers, 1983). Through visibility, the innovation can spur discussion on how others may also adopt the same behavior in order to reduce their risk exposure to asthma. The strength of the Diffusion of Innovation theory is on its ability to measure the influences in adoption of decisions. Innovation and behavioral change flow through communication, which may either accelerate or impede behavioral spread. According to Rogers (2002), listening and involving others can help increase the speed of adoption of new behaviors or ideas. This will be evidenced within this DNP project with use of verbal feedback and questionnaires.

Description of Project Design

The design of this project will be a quality improvement (QI) model. A QI is a systematic approach to improving performance. QIs are essential when attempting to improve safety, outcomes, and efficiency (American Academy of Family Physicians, 2019).

The overall purpose of the project implementation is to guide providers in implementing an ATP for adults in an urban community health care clinic. Efforts of all stakeholders and population of interests in the project will be utilized fully. In this project, the populations of interest are the health care providers and medical assistants that will implement the ATP and provide education to asthmatic patients.

This project will be implemented in a systematic fashion. First, a pre-implementation chart audit of 30 asthmatic patients will be examined for post data comparison. The primary population of interest which consists of host site medical providers and staff will be recruited for training at the practice site. After the training is carried out, healthcare providers will implement the ATP. Data collection and analysis of objectives will occur during a four-week period after the training.

To determine if the objectives of the project have been met, there will be a retrospective and post project implementation chart review for data collection and information will be compiled and The Statistical Package for Social Sciences (SPSS) will be utilized for analysis.

Setting

The setting for this project is a nonprofit community health care center located in Las Vegas, NV. This community health care center is a federally qualified health center that is partially funded under section 330 of the Public Health Service Act. Patients are not discriminated against in the delivery of health care services based on sexual orientation, mental

or physical disability or source of payments. This clinic provides primary care services to approximately 100 individuals each day. They strive to embrace the latest resources, technologies, and quality clinicians. The clinical providers include two nurse practitioners, one physician, and four medical assistants. The clinic is open Monday through Friday 7am to 6pm. Permission to conduct the project has been provided by the project site administrator (Appendix B).

The Population of Interest and Stakeholders

The population of interest involves advanced nurse practitioners, physicians, and medical assistants who will be implementing the ATP. According to Porter-O'Grady and Malloch (2015), the population of interest must be trained continually to adopt the necessary clinical knowledge. The ATP is new to the clinical setting and must be applied carefully by ensuring that all staff is thoroughly prepared for project implementation. The inclusion criteria are all full-time permanent staff of the community health care center. Clinicians and staff will only be excluded if they are serving in temporary positions.

Stakeholders in this project include the practice site manager, chief medical officer (CMO) and lead medical assistant. The CMO will be the content expert and will be consulted during the implementation of this project. The practice site manager is the project facilitator, and in collaboration with the project leader will assist in the evaluation of this ATP. The lead medical assistant will coordinate the team members throughout the asthma project and will facilitate the clinic staff with performing spirometry. The project lead will maintain appropriate communication with the key stakeholders and clinical facility staff to prepare the resources required for project implementation.

Recruitment Methods

The staff was given a brief overview of this QI project during a mandatory monthly staff meeting. All nurse practitioners, physicians, and medical assistants in the clinical facility that meet the inclusion criteria will be invited to participate in this quality improvement project. Participation is voluntary. The inclusion criteria incorporated all full-time permanent staff of the community health care center. Clinicians and staff were only excluded if they were serving in temporary positions.

Asthma training will be provided to clinicians during the regularly scheduled mandatory monthly provider meeting prior to project implementation. All clinicians will be given a copy of the ATP and this guideline will be discussed in detail at the provider meeting. A separate training will occur for the medical assistants during their mandatory staff meeting, which will include proper use of inhalers and performing spirometry.

Tools and Instruments

The ATP is the new protocol that clinicians will be utilizing during the implementation of this project (Appendix C). The ATP was developed based on current recommendations by the project lead. The project team and mentor will review the ATP and be approved by site administrators prior to project implementation.

As a part of this ATP, Asthma Control Tests (ACTs) will be utilized to assist providers in evaluating the state of impairment (Appendix D). Scoring for ACTs range from 5 to 25 and a score of < 19 indicates asthma that is sub optimally controlled and guides further recommendations. According to a meta-analysis of current Asthma questionnaires, this tool is considered sufficiently validated for use in adult populations (Cloutier, et. Al.,2014). The ACT will complement the use of spirometry, physical exam, and history.

A chart audit tool will be utilized for data collection during the retrospective and post project implementation. It will be specifically designed to collect all data according to inclusion criteria and project objectives. Data collected within the chart audit tool will include age, diagnosis, spirometry, medication use, and documentation of education (Appendix E).

In alignment with the second objective, education will be provided to staff. A guideline will be provided to all clinicians, and all sections will be discussed in detail with staff during the regularly scheduled mandatory monthly meeting. Attendance will be taken in order to ensure that all participants have undergone education. No patient or staff names or identifiers will be used during data collection. After presentation, a copy of this guideline will be emailed to all staff that is participating in this QI project. Staff will be educated on the main objectives, which is to provide an asthma action plan on all patients, Spirometry at minimum must be performed annually, and controller medication should be prescribed to any asthmatic with a diagnosis of moderate persistent asthma or greater.

Data Collection Procedure

Data collection will begin once recruitment has been completed and education has been provided. The project lead will collect all retrospective and post project data from chart reviews. Every effort will be made in order to protect the data that is being collected during this project. The retrospective chart review will be conducted during the first week of project implementation utilizing the chart audit tool. The ATP implementation portion of this project will be implemented by participating clinicians and conducted over a period of three weeks. A post project chart review will be conducted during the fourth week of project implementation. Charts will be abstracted from the EHR based on specific criteria of age and diagnosis of moderate persistent asthma or greater utilizing the diagnosis code of J45.4, J45.5, and J45.9. The first 30

charts that meet the abstracted criterion will be selected for review in order to ensure validity. A post project implementation chart review will be conducted utilizing the chart audit tool. The project lead will utilize comparisons from pre and post measurements. All data collected will be stored on a password protected computer and will not include any personal patient identifiers.

Chart Review

A retrospective and post project implementation EHR chart review of 30 charts will be used to select the population sample. Charts will be abstracted from the EHR based on a diagnostic criterion of moderate persistent asthma or greater (Appendix F). Patients must be seen within the past year, be 18 years of age or older, and have been seen by clinicians that are participating in this project. These convenience sample charts will be reviewed and placed into categories based on The National Asthma Education and Prevention Program (NAEPP EPR) 3 recommendations (NHLBI, 2018). The first categories will cover an evaluation of EHR documentation of patients' age, current medication list, frequency of medication use in order to ensure that project objectives can be met. The next category will review documentation of a physical examination and spirometry within the past year. And the final category will focus on documentation of patient education, a written asthma action plan, and use of a controller medication for any diagnosis of moderate persistent asthma or greater. Finally, compliance of this ATP will be determined by a 75% improvement in a prescribed controller medication, performance of spirometry, and documentation of education.

Intervention/Project Timeline

The timeline for this DNP project is as follows:

Week 1: November 6-12, 2019

The project leader will meet with the participating clinicians and staff to implement the asthma treatment protocol on November 6th, 2019 at 12:00pm. Clinicians will receive training on implementation of the ATP (Appendix G). The staff will begin implementation of the ATP. The project leader will be conducting retrospective chart reviews during this time.

Week 2-3: November 13-19th, 2019

The project implementation phase will continue during this time. The project lead will be available to clinicians and staff members each day to answer any questions and to collect data. The project lead will be present during the daily huddle (regularly scheduled brief meeting with all staff members) to receive feedback and provide any potential updates regarding project implementation.

Week 4: November 20-26th, 2019

The project lead will collect post project implementation data. Charts will be reviewed and analyzed. The retrospective and post protocol data findings will then be compared. The project results will be evaluated and interpreted, and findings will be shared with the clinic manager, clinic providers and staff and Chief medical officer.

Ethics/Human Subjects Protection

Research with human participants has advanced knowledge within medical science and has provided invaluable information (American Psychological Association, 2019). Research conducted with humans is strictly regulated. There is legislation at local, state, and federal levels. Professional societies in turn, have developed standards and guidelines to ensure that a patients'

rights are protected (American Psychological Association, 2019). Quality improvement projects that are designed for internal purposes that do not contribute to research typically do not require IRB review (Stoddard, 2019). An IRB determination form and supporting materials will be submitted to determine if IRB approval is needed at TUN. However, the clinical procedures within this project are established guidelines and considered standard procedures. Therefore, this project is not expected to require IRB approval through TUN or the project site.

The participants in this project will be health care providers and clinical staff members. In order to protect all participants no names or identifiers will be used during data collection. Participants will not be asked for any identifying or personal information. All data collected will be stored in a password protected computer and will not store any patient or participant identifiers. All files and Chart audit tools will be stored on site in a locked file cabinet. The project lead will remain in possession of the key and have the only access. The only data collected will be used for the sole purpose of analyzing and measuring outcomes in order to meet objectives. There will be no compensation for participating in this project as it is completely voluntary.

Plan for Analysis/Evaluation

All retrospective data will be collected and entered into an Excel spreadsheet and stored securely during week one. Each day during project implementation the project lead will abstract data from the EHR utilizing the inclusion criteria. Data will be entered into an Excel spreadsheet and stored securely. The parameters that will be addressed are having a diagnosis of moderate persistent asthma or greater, documentation of spirometry within the past year, documentation of education or an asthma action plan, and finally a prescribed controller medication.

All data will then be exported into the Statistical package for the social sciences (SPSS). SPSS is software for editing and analyzing data (Statistical Packages for the Social Sciences, 2019). The project design will compare pre-and post-outcome measures utilizing a nonparametric Pearson's chi-square test. The chi-square test will be utilized to determine whether there is a significant difference between the expected and the observed parameters in more than one category (Statistical Packages for the Social Sciences, 2019). This test will be ran in order to determine if there is a difference between pre and post implementation of the asthma screening protocol. The chi-square test is utilized when analyzing the relationship between variables (Hazra & Gogtay, 2016). These tests are necessary to assist with confirming whether participants will benefit from this protocol.

Significance/Implications for Nursing

The aim of this DNP project is to guide providers in implementing an ATP for adults in an urban community health care clinic. Currently, there is no cure for asthma and the goal is to maintain control of symptoms. Multiple studies have shown that the vast majority of patients can achieve control of their asthma regardless of their level of severity (Papaioannou et al., 2015). One of the top reasons for hospital admissions is due to asthma that is uncontrolled (Centers for Disease Control and Prevention, 2017)

This project is significant to the profession of nursing because it specifically addresses the care of asthmatic in order to reduce complications. Nurses have the potential to improve outcomes for patients through education, leadership, and providing evidence-based care.

The significance of this project to the nursing profession will be impactful in any setting as it utilizes the most update to date guidelines and recommendations. The DNP prepared nurse is often in a role of leadership and can assist with implementation of ATPs in settings that may

not have guidelines available. The CDC has issued a recommendation that stakeholders and clinicians implement guideline-based care to all asthmatics (LaPointe, 2018). The ATP has the potential to be duplicated within similar settings throughout the United States. The DNP prepared nurse has been prepared to provide education, advocation, and guide clinicians in providing evidence-based practice in order to improve healthcare outcomes.

Analysis

The quality improvement project was implemented at a community health care center located in southern Nevada. The analyzing of data included abstracting data prior to project implementation utilizing the specified inclusion criteria, and then comparing with post project data (Appendix E). The clinical practice guidelines to improve the treatment of asthmatics resulted in an increase in education documentation, controller medication prescriptions, and the utilization of spirometry during project implementation. These interventions are considered best practice in the care of asthmatic patients according to research and current guidelines.

Statistical analyses were performed utilizing Chi-square, which was used to determine whether there were any significant differences between the baseline interventions prior to the implementation of the treatment protocol compared with the post-implementation phase which was implemented over a four-week period. This final analysis included a comparison of the pre and post implementation data utilizing the Statistical Package for the Social Sciences (SPSS).

A Chi-square test was chosen to show the relationship between these categorical variables. There was a pre and post implementation EMR chart audit and the data was coded as 1= Category completed and 2 = Not completed for each of the parameters of the chart review. A "1" indicated the parameter in question was completed whereas a "2" indicated the parameter was not completed. Categories were completion of spirometry, controller medication prescribed,

and documentation of education on chart (Appendix H). Therefore, a lower score suggested the parameters were appropriately covered with patients during office consultation, whereas a higher score suggested that not all parameters were appropriately covered, if at all. The Chi-Square statistic was used to evaluate tests of independence using a crosstabulation. This was performed to discern whether there was a statistically significant difference between if patients were prescribed controller medications, completed spirometry, and had education provided prior to project implementation vs post implementation (Appendix I). The goal was there would be a 75% improvement in all three areas.

The Chi-Square test illustrated a statistically significant change when compared to pre project data evaluation. During the four weeks of project implementation, the project lead kept in close contact with clinicians, staff and the practice manager. Daily huddles included updates and provided opportunities for staff to ask questions and voice any concerns. Staff and clinicians underwent education and then the project was implemented for a full 3 weeks. A retrospective chart review was completed concurrently on a convenience sample of 30 patients who met the inclusion criteria and data was placed into an excel spreadsheet. There were 4 clinicians and 8 medical assistants that participated in the QI project.

The following illustrates the results of the Chi-Square test for independence performed prior to QI project and post project implementation represented in Table1.

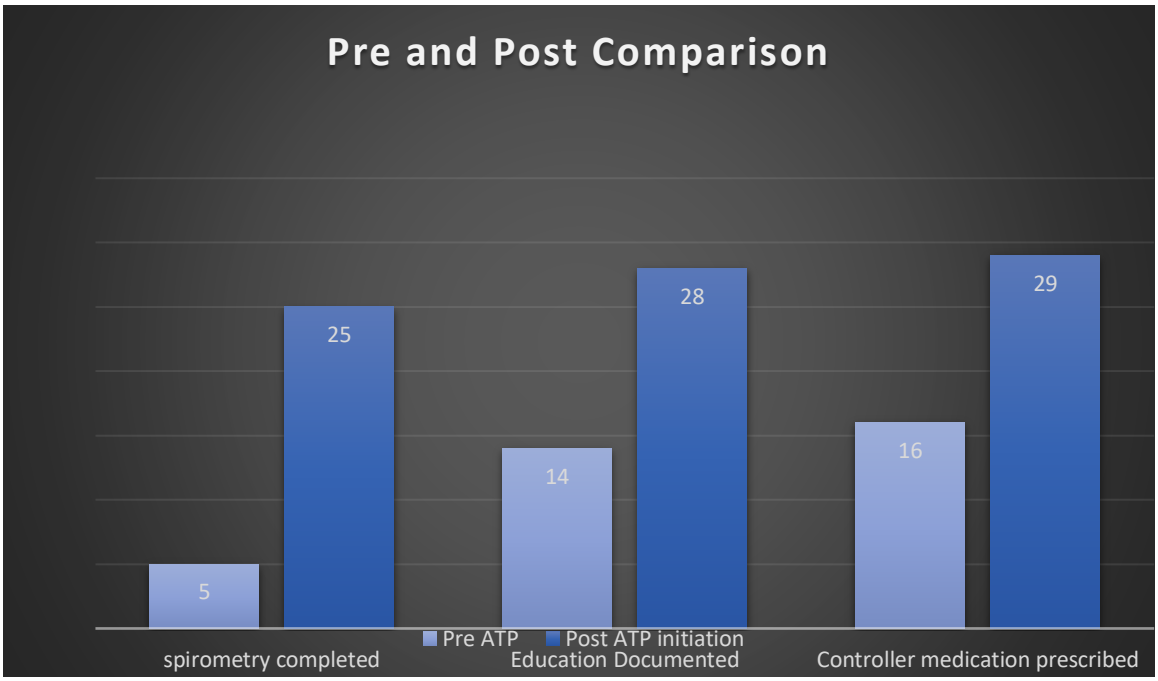

Table 1

The results of the Chi-square test of independence showed that there was a statistically significant improvement between pre and post data collection with a p value of 0.05. The Chi-Square crosstabulation was then utilized to determine if there was an improvement between pre and post data. This crosstabulation showed a statistically significant improvement in the number of spirometry's that were completed, controller medications prescribed, and the documentation of asthma education. During the retrospective chart review of spirometry Chi square test of independence showed that only 16% of individuals had completed a spirometry within the past year, while post review of data revealed that 83% of patients completed a spirometry during project implementation. Retrospective chart review revealed that 53% of individuals were prescribed controller medications, while post data revealed that 93% of individuals were prescribed controller medications with a diagnosis of moderate persistent asthma or greater. Finally, in retrospective chart review only 46% of patients had asthma education documented,

while post project review revealed that 96% of patients had documented education, which was the most significant improvement. The analysis has revealed that the goal of this project has been met with a great than 75% improvement in all areas.

Discussion of the Findings and Significance for Nursing

The aim of this DNP project is to guide providers in implementing an ATP for adults in an urban community health care clinic. Overall, the ATP implementation was effective in increasing the number of patients that had spirometry completed, controller medication prescribed, and education documented. Evidence-based guidelines and recommendations have been well established but were not consistently being implemented at this project site. By implementing this new ATP the goal is to improve the lives of asthmatics. The parameters that were addressed during this project implementation were individuals that had a diagnosis of moderate persistent asthma or greater, documentation of spirometry within the past year, documentation of education or an asthma action plan, and finally a prescribed controller medication. The pre-implementation findings of the chart audits showed that the practice had significant room for quality improvement. The most significant improvements were found in prescribing controller medications and providing education upon post project review. Performance of spirometry had the least improvement with only 83% of patients having a spirometry completed upon post project review. Staff reported one likely cause is time constraints of patients. The lead medical assistant reported that on two separate occasions, that spirometry was offered, but patients declined due to other appointments and a work commitment. Performance of spirometry can be time consuming so one possibility would be to educate patients that spirometry's need to be completed annually so that they can prepare for this longer routine appointment. A diagnosis of asthma is only confirmed when spirometry shows

obstruction and reversibility by an increase in FEV1 of >12% after use of a bronchodilator (The National Asthma Education and Prevention Program [NAEPP], 2017). Routine use of spirometry must be performed on all asthmatic patients in order to properly diagnose and to manage symptoms. While the implementation of this project significantly improved use of spirometry, there is room for continued improvement.

This project is significant to the profession of nursing because it specifically addresses evidence-based care in order to reduce complications in asthmatic patients. Uncontrolled asthma is one of the top reasons for hospital admissions (Centers for Disease Control and Prevention, 2017). Nurses have the potential to improve outcomes for patients through education, leadership, and providing evidence-based care. The ATP has the potential to help patients manage their asthma and prevent serious complications.

Limitations

There were some notable limitations of this quality improvement project. One limitation was the small sample size. This sample size was chosen in order to ensure there were an equal amount of patients to compare between pre and post project implementation due to a short timeframe of 4 weeks. This project was constrained to a small size for logistical purposes and could have provided more statistically significant results had time allowed for a larger population size to be recruited. The short duration of this project was also a limitation. A longer time frame would have allowed for a larger sample size and therefore may have provided higher-quality data. This project was limited to one clinic, when this community health care center has multiple locations. Since the majority of patients belonged to one geographical location it is possible that other factors may have played a role in this project, such as socioeconomics and environmental exposures. A larger population at more locations along with more data points would have

increased the likelihood of statistically significant results. This would have provided a stronger trend for sustainability. Another limitation was that this DNP project focused on specific criterion, which makes it more difficult to make assumptions of generalizability. Since this project had specific goals and findings, it would be difficult to make these results transferable in another context.

Dissemination

The QI project will be disseminated through the teaching guidelines developed and protocol designed for its implementation. Touro University currently has an annual research day, which will take place on March 12th, 2020. The abstract for this project was submitted to a Touro University committee for consideration of a poster presentation during research day. An abstract was also submitted to the national conference for nurse practitioners (NCNP) for poster presentation in Spring 2020. This QI project will be submitted to the Doctoral Project Repository for academically interested researchers to have access to this project in the future (https://www.doctorsofnursingpractice.org/doctoral-project-repository/).

Sustainability

The tools and protocols created during the QI project have been accepted into practice at this community health care center as the current standard of practice. This occurred after presenting findings of project to the chief medical officer and practice manager with the addition of positive feedback from participating clinicians. The ATP is currently undergoing final review from the director of clinical practices to ensure that no changes are required. The protocol will be added to the global file within this company's intranet so that it is accessible in all locations. The protocol created is based on current guidelines and recommendations and can be continually modified as needs arise and ongoing evidence-based practice dictates in the future for continued

sustainability. This process brought different specialties together including management stakeholders to work in collaboration to ensure that patients were receiving best practice and recommendations, which ultimately ensured that this project was successful.

This project was a sustainable initiative for this community health care center. The ATP has the potential to help patients manage their asthma and prevent serious complications. This may help reduce visits to the emergency department by focusing on preventative measures. This project would prove most successful if clinicians continued to implement this ATP once this project has been completed. This ATP is feasible and should be implemented every time an asthmatic seeks care.

Conclusion

In conclusion**,** asthma is a chronic inflammatory lung disease that causes episodes of wheezing, coughing, and feelings of breathlessness (National Committee for Quality Assurance [NCQA], 2018). The symptoms of asthma have been well documented and researched for over two and a half millennia, and yet millions of individuals continue to suffer from this condition (Allergy and Asthma Medical Group & Research Center, 2018). The aim of this DNP project was to guide providers in implementing an ATP for adults in an urban community health care clinic. The ATP was developed based on current guidelines and recommendations. The project took place over a 4-week time period and focused on improving the use of spirometry, prescribing controller medications, and documentation of education for asthmatic patients. The analysis has revealed that the goal of this project has been met with a great than 75% improvement in all three-focus areas. The ATP has the potential to help patients manage their asthma and prevent serious complications.

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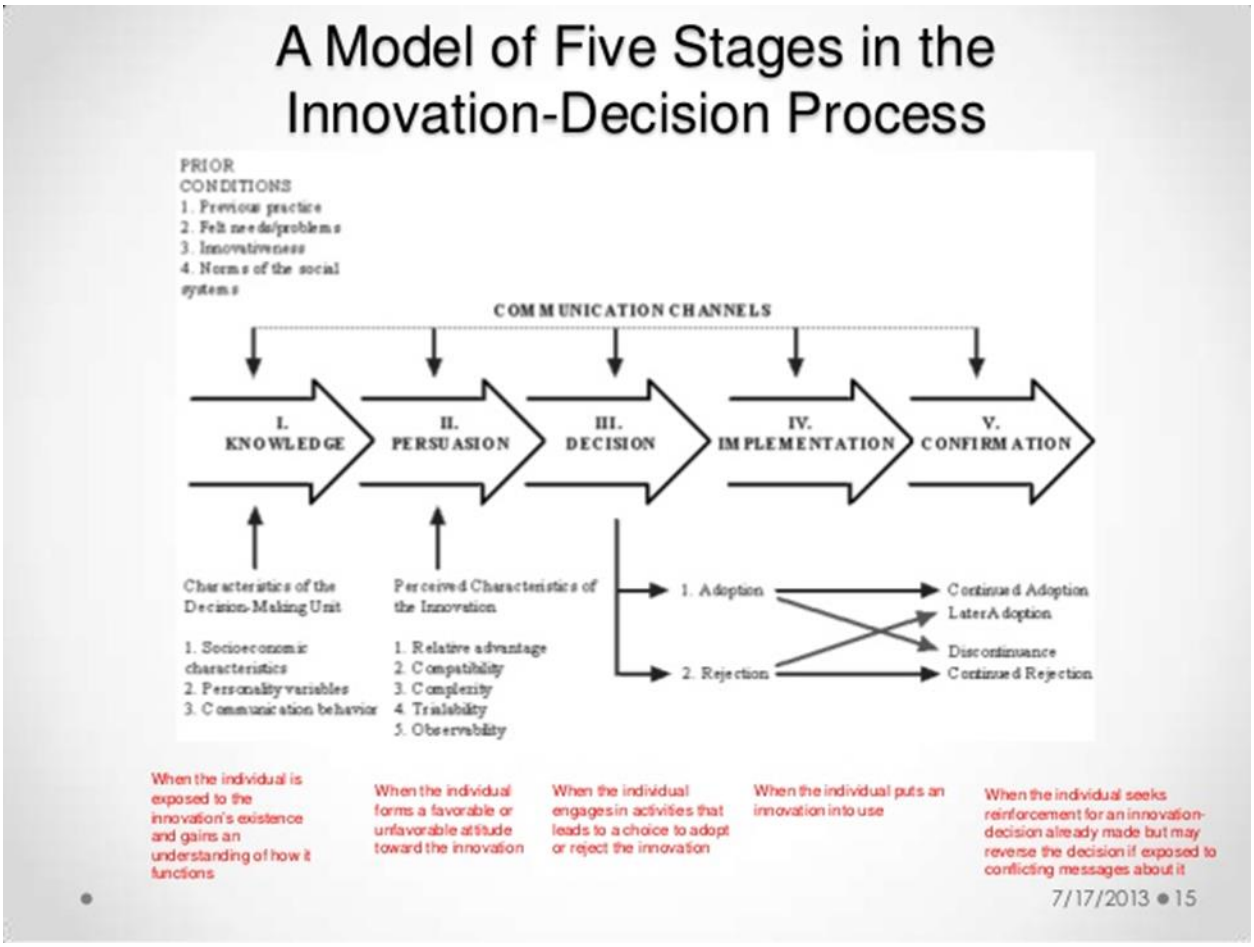
Appendix A


A Model of Five Stages in the Innovation-Decision Process
PRIOR CONDITIONS
1. Previous practice
2. Felt needs/problems
3. Innovativeness
4. Norms of the social systems
COMMUNICATION CHANNELS
I. KNOWLEDGE
II. PERSUASION
III. DECISION
IV. IMPLEMENTATION
V. CONFIRMATION
Characteristics of the Decision-Making Unit
1. Socioeconomic characteristics
2. Personality variables
3. Communication behavior
Perceived Characteristics of the Innovation
1. Relative advantage
2. Compatibility
3. Complexity
4. Trialability
5. Observability
1. Adoption
2. Rejection
Continued Adoption
Later Adoption
Discontinuance
Continued Rejection
When the individual is exposed to the innovation's existence and gains an understanding of how it functions
When the individual forms a favorable or unfavorable attitude toward the innovation
When the individual engages in activities that leads to a choice to adopt or reject the innovation
When the individual puts an innovation into use
When the individual seeks reinforcement for an innovation-decision already made but may reverse the decision if exposed to conflicting messages about it
7/17/2013 ● 15

Appendix B

Approval Sheet

I would like to acknowledge and approve implementation of the project: Asthma Management in an urban community health clinic: A Guideline Approach

Joanna Perna, Practice Manager
Cambridge Family Health Center
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Las Vegas, Nv 89119

Date: 8/15/19

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Appendix C

Asthma Treatment Protocol

Purpose: This protocol will improve accurate diagnosing, care practices, and medication management in patients with Asthma

Objectives:

-Provide a resource to address the care of asthmatics based on guidelines and evidence-based research

-Asthmatics with a diagnosis of moderate persistent asthma or greater will be prescribed a controller medication

-Asthmatics will have a Spirometry completed annually

-All Asthmatics will have education, or asthma action plan documented.

Indications: Patients with Moderate persistent Asthma or greater. ICD 10 codes as follows: J45.4, J45.5, and J45.9.

Contraindications: Not intended for pediatric population or non-confirmed diagnosis of asthma

Steps:

1. Medical provider will determine diagnosis of moderate persistent asthma or greater

2. A) Provider Assessment:

- Most common symptoms of asthma are dyspnea or labored breathing, audible wheezing, tightness of chest and persistent coughing
- Moderate Persistent Asthma classification: Use of rescue inhaler >2-week, nighttime symptoms at least once a week, and/or FEV1 <60% of predicted values.
- Spirometry to be performed by Medical Assistant at time of diagnosis, during exacerbations and/or annually.

- Complete an asthma action plan for every patient. If asthma action plan previously completed, then general education should be completed and documented at every visit

3: B) Medical Assistant duties:

- Assess use of rescue inhaler and complete asthma control test
- Determine if Spirometry has been conducted within the past year.
- Perform medication reconciliation.

Plan: Clinician will create patient centered goals regarding asthma control

Interventions:

Interventions	**Monitoring**	**Recommendations**
Spirometry performed if not completed within 1 year	Medication to be prescribed based on a step wise approach	Step down once FEV1 has reached >80% of predicted value or ACT >16
Controller medication to be prescribed as indicated	Recheck patients within 4 weeks of any increase in step, or 2 weeks after any exacerbations	Step up if FEV1 is <80% of predicted value or ACT score <16.
Asthma action plan to be completed by providers	Asthma Control Test to be completed at every visit	Notify medical provider for worsening signs/symptoms of asthma

Medications:

- Rescue inhaler to be prescribed for every asthmatic
- Controller medication should be prescribed for moderate persistent asthma or greater diagnosis

Quick relief Medications

1. SABAS (all patients with asthma)

Albuterol inhaler 90mcg inhalers (ProAir, Ventolin)

Albuterol 0.83% given via nebulizer

2. Anticholinergics (used for more severe attacks, not for maintenance)

Ipratropium (0.02%) 0.5mg per 2.5 ml

Tiotropium 1.25 mcg per actuation, 2.5 mcg per actuation

3. Systemic Corticosteroids (used for asthma exacerbations)

Prednisone 5mg, 10mg, 20mg, 50mg

Medrol dose pack as directed

Controller Medications

1. Corticosteroids (1st line maintenance therapy)

Advair 250mcg/50 mcg per blister, 500mcg/50mcg per blister

Arnuity Ellipta 100mcg per blister, 200 mcg per blister

2. LABAS: (add on for asthma not controlled on rescue & ICS medication)

QVAR 40 mcg per actuation, 80mcg per actuation

Asmanex 100mcg per actuation, 200 mcg per actuation

3. Leukotriene Modifiers (add on with concurrent allergies)

Montelukast 10mg

Zileuton 600mg

Spirometry

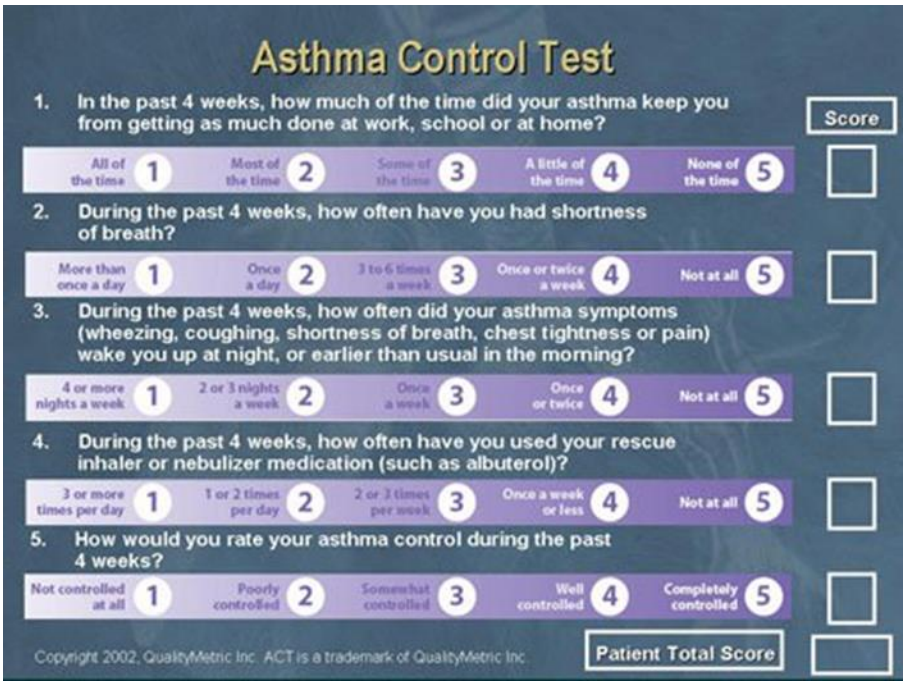
-Can be normal when no symptoms present. Does not rule out Asthma

-Reduced FEV1 and absolute FEV1/FEV ratio indicates asthma

Education

- Avoiding Triggers
- Proper use of inhalers
- Asthma action plan

Appendix D


Asthma Control Test
1. In the past 4 weeks, how much of the time did your asthma keep you from getting as much done at work, school or at home?
Score
All of the time 1
Most of the time 2
Some of the time 3
A little of the time 4
None of the time 5
2. During the past 4 weeks, how often have you had shortness of breath?
More than once a day 1
Once a day 2
3 to 6 times a week 3
Once or twice a week 4
Not at all 5
3. During the past 4 weeks, how often did your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night, or earlier than usual in the morning?
4 or more nights a week 1
2 or 3 nights a week 2
Once a week 3
Once or twice 4
Not at all 5
4. During the past 4 weeks, how often have you used your rescue inhaler or nebulizer medication (such as albuterol)?
3 or more times per day 1
1 or 2 times per day 2
2 or 3 times per week 3
Once a week or less 4
Not at all 5
5. How would you rate your asthma control during the past 4 weeks?
Not controlled at all 1
Poorly controlled 2
Somewhat controlled 3
Well controlled 4
Completely controlled 5
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Patient Total Score

Appendix E

CHART AUDIT TOOL

Retrospective Chart Audit

Criteria	Y or N	Results
Age	Y- 30/30	30 individuals selected > age 18 years
Diagnosis	Y-30/30	Moderate persistent asthma or greater
ICD 10	Y 30/30	J45.4, J45.5, and J45.9
Controller Medication	Y 16/30	16/30 individuals had controller meds prescribe
Spirometry documentation	Y 5/30	5/30 had completed spirometry within the past year
Education on Chart	Y 14/30	14/30 had education documented

CHART AUDIT TOOL

Post Project Chart Audit

Criteria	Y or N	Results
Age	Y- 30/30	30 individuals selected > age 18 years
Diagnosis	Y-30/30	Moderate persistent asthma or greater
ICD 10	Y 30/30	J45.4, J45.5, and J45.9
Controller Medication	Y 28/30	28/30 individuals had controller meds prescribe
Spirometry documentation	Y 25/30	25/30 had completed spirometry within the past year
Education on Chart	Y 29/30	29/30 had education documented

Appendix f

Asthma

60

√ 5th - J45.4 Moderate persistent asthma

J45.40 Moderate persistent asthma, uncomplicated

Moderate persistent asthma NOS

J45.41 Moderate persistent asthma with (acute) exacerbation

J45.42 Moderate persistent asthma with status asthmaticus

√ 5th - J45.5 Severe persistent asthma

J45.50 Severe persistent asthma, uncomplicated

Severe persistent asthma NOS

J45.51 Severe persistent asthma with (acute) exacerbation

J45.52 Severe persistent asthma with status asthmaticus

J45.9 Other and unspecified asthma

Appendix G

file:///C:/Users/Adriene/AppData/Local/Packages/Microsoft.MicrosoftEdge_8wekyb3d8bbwe/TempState/Downloads/NVHCAsthmaGuide%20(1).pdf

Appendix H

Pre Project implementation

Spirometry completed

	Observed N	Expected N	Residual
Spirometry Completed Pre	5	10.0	-5.0
No Spirometry Completed Pre	25	20.0	5.0
Total	30		

Educated Documented

	Observed N	Expected N	Residual
Education Completed Pre	14	10.0	4.0
No Education Completed Pre	16	20.0	-4.0
Total	30		

Controller Medication Prescribed

	Observed N	Expected N	Residual
Controller Medication Prescribed Pre	16	10.0	6.0
No Controler medication Prescribed Pre	14	20.0	-6.0
Total	30		

Post Project Implementation

Spirometry Post

	Observed N	Expected N	Residual
Spirometry completed Post data	25	10.0	15.0
No Spirometry completed post data	5	20.0	-15.0
Total	30		

Education Documented Post

	Observed N	Expected N	Residual
Education Documented Post Project	29	10.0	19.0
No Education Documented Post Project	1	20.0	-19.0
Total	30		

Controller medication prescribed Post

	Observed N	Expected N	Residual
Controller Medication Prescribed Post	28	10.0	18.0
No Controller Medication Prescribed Post	2	20.0	-18.0
Total	30		

Appendix I

Spirometry completed * Spirometry Post Crosstabulation

			Spirometry Post Spirometry completed Post data
Spirometry completed	Spirometry Completed Pre	Count	5
		% within Spirometry completed	100.0%
		% within Spirometry Post	20.0%
		% of Total	16.7%
	No Spirometry Completed Pre	Count	20
No Spirometry Completed Pre	Count	20	
	% within Spirometry completed	80.0%	
	% within Spirometry Post	80.0%	
	% of Total	66.7%	
Total		Count	25
		% within Spirometry completed	83.3%
		% within Spirometry Post	100.0%
		% of Total	83.3%

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Educated Documented * Education Documented Post Crosstabulation

			Education Documented Post Education Documented Post Project
Educated Documented	Education Completed Pre	Count	14
		% within Educated Documented	100.0%

		% within Education Documented Post	48.3%
		% of Total	46.7%
	No Education Completed Pre	Count	15
		% within Educated Documented	93.8%
		% within Education Documented Post	51.7%
		% of Total	50.0%
Total		Count	29
		% within Educated Documented	96.7%
		% within Education Documented Post	100.0%
		% of Total	96.7%

Controller Medication Prescribed * Controller medication prescribed Post Crosstabulation

			Controller medication prescribed Post Controller Medication Prescribed Post
Controller Medication Prescribed	Controller Medication Prescribed Pre	Count	16
		% within Controller Medication Prescribed	100.0%
		% within Controller medication prescribed Post	57.1%
		% of Total	53.3%
	No Controler medication Prescribed Pre	Count	12
		% within Controller Medication Prescribed	85.7%
		% within Controller medication prescribed Post	42.9%
		% of Total	40.0%
Total		Count	28

	% within Controller Medication Prescribed	93.3%
	% within Controller medication prescribed Post	100.0%
	% of Total	93.3%