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An Educational Intervention to Improve Healthcare Provider Confidence and Utilization of the
Teach-Back Method When Providing Patient Education on Inhaler Technique

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Abstract

Background: Patients with asthma and COPD often do not use prescribed inhalers correctly. This impacts the safety and effectiveness of the medication and potentially leads to increased symptoms, exacerbations, and hospitalizations. Inhaler technique should be assessed regularly; however, many patients do not receive initial education on devices or follow up evaluation to ensure correct use. Many healthcare providers (HCPs) are not properly educated on how to use inhalers, and a correlation exists between poor patient inhaler technique and improper training by HCPs. **Purpose:** The purpose of this quality improvement project is to increase HCPs ability and confidence to teach and assess inhaler technique among asthma and COPD patients.

Methods: This project included an educational in-service at a primary care office. HCPs were provided education on how to teach and assess inhaler technique utilizing the teach-back method. The intervention included pre-intervention surveys and presentation of a PowerPoint. Post-intervention included an immediate post- intervention survey following the PowerPoint presentation to evaluate effectiveness of the in-service. Four weeks following the in-service participants were given another survey to evaluate HCPs use of learnings as part of their routine plan of care in practice. **Results:** Findings included overall increases in HCP confidence and utilization of the teach-back method as a result of the intervention. **Conclusion:** This DNP project supported findings in literature that many HCPs do not assess inhaler technique at office visits and are not adequately trained to teach and assess technique. The teach-back method proved to be an effective method to help increase HCPs ability and confidence to teach and assess inhaler technique in asthma and COPD patients.

Keywords: *inhaler, technique, education, selection, teach-back*

An Educational Intervention to Improve Healthcare Provider Confidence and Utilization of the Teach-Back Method When Providing Patient Education on Inhaler Technique

Introduction

Asthma and chronic obstructive pulmonary disease (COPD) are chronic inflammatory diseases of the respiratory tract that impacted 339 and 252 million people worldwide, respectively, in 2016 (Kaplan & Price, 2018). Both diseases cause airflow limitation that impose a significant burden on the patient, family, and healthcare system (Global Initiative for Asthma [GINA], 2018; Kaplan & Price, 2018). Asthma and COPD are not curable diseases, but they can be effectively managed with inhaled medications, such as inhaled corticosteroids (ICS), short acting beta agonists (SABA), long acting beta agonists (LABA), and antimuscarinic agents (Kaplan & Price, 2018). The Global Initiative for Asthma (GINA, 2018) and Global Initiative for Chronic Obstructive Lung Disease (GOLD, 2018) treatment guidelines recommend the use of inhaled medications to decrease symptoms and exacerbations and improve quality of life and lung function (Press et al., 2016).

Inhaled therapy directly delivers medications to the lungs and is provided to patients in a variety of different devices, including nebulizers, pressurized metered dose inhalers (pMDIs) with or without spacers, dry powder inhalers (DPIs), and soft mist inhalers (SMIs) (Kaplan & Price, 2018). Despite the availability of devices, poor inhaler technique has a significant effect on the therapeutic benefit offered by these devices (Kaplan & Price, 2018). The purpose of this Doctor of Nursing Practice (DNP) project is to educate healthcare professionals (HCPs) how to teach and assess inhaler technique in asthma and COPD patients, with an overall goal of increasing HCPs ability and confidence to teach and assess inhaler technique in these patient populations.

Background

Inhaled therapy options and evidence-based guidelines have offered effective therapy guidance in managing asthma and COPD; however, disease control continues to be suboptimal in these patients (Gregoriano et al., 2018). Research has consistently demonstrated that many patients with asthma and COPD do not use prescribed inhalers correctly (Kaplan & Price, 2018). A variety of sequential steps are necessary with each inhaler device and performing one or more steps incorrectly can substantially reduce the delivery of drug to the lungs, and consequently impact the safety and effectiveness of the medication (Gregorian et al., 2018).

Across all devices, incorrect technique is common, with up to 100% of patients demonstrating one or more errors, and 92% of patients demonstrating critical errors impacting the effectiveness of drug delivery (Kaplan & Price, 2018). It is estimated the 28%-68% of outpatients and 62%-86% of inpatients do not use their inhalers correctly, placing them at risk for worsening disease control and hospitalizations (Price et al., 2016). Inhaler misuse accounts for \$5 to \$7 billion of the approximate \$25 billion spent on inhalers annually (Melani et al., 2017; Price et al., 2016).

Poor inhaler technique has been found to be correlated to patients misunderstanding of how to use their devices, and this can result in a reluctance of use (Kaplan & Price, 2018). Patients are often unaware they are using the inhalers incorrectly or they overestimate their ability to perform inhalation technique (Gregorian et al., 2018). The type and frequency of errors varies across devices, although common errors have been found to be universal (Kocks et al., 2018). The GINA (2018) and GOLD (2018) guidelines recommend that inhalation technique be assessed on a regular basis. Unfortunately, many patients do not receive effective training from healthcare professionals. Healthcare professionals that generally provide inhaler education

includes medical assistants, registered nurses, licensed practical nurses, physicians, respiratory therapists, nurse practitioners, physician assistants, and pharmacists. It has been reported that 39%-67% of HCPs do not train patients on correct inhaler use, and HCPs neglect to check inhaler use at subsequent visits (Price et al., 2018). It is recommended that patients receive initial education and reeducation from HCPs on inhaler technique to ensure correct use (Bjermer, 2014).

Patients may receive limited or improper inhaler education because many HCPs do not have the skills needed to deliver inhaler education to patients (Basheti, Hamadi, & Reddel, 2016). Many HCPs who prescribe and/or administer inhalers are not educated sufficiently on the proper technique of each device (Alismail et al., 2016). Incorrect inhaler technique has been reported with nurses, pharmacists, general practitioners, and respiratory specialists (Basheti et al., 2016). One study reported that 30% of inpatient hospital nurses did not know how to perform correct inhaler technique (Tratto et al., 2014). A direct correlation has been documented between patients receiving improper instructions and poor inhaler technique (Alismail et al., 2016). Education for HCPs on inhaler technique is necessary as HCPs play a key role in teaching proper technique to patients (Basheti et al., 2016).

Problem Statement

The risk of incorrect inhaler technique can lead to suboptimal disease control in asthma and COPD patients. This is evidenced by decreased quality life, exacerbations, and worsening of symptoms. This results from a lack of training, education, and evaluation from the healthcare team. Healthcare providers lack of ability and confidence of how to assess and effectively teach inhaler technique.

Organizational “Gap” Analysis of Project Site

This quality improvement project was implemented at a primary care office located in Massachusetts. The primary care office is an independent office that serves the residents of southern Massachusetts. The healthcare team consists of registered nurses (RNs), licensed practical nurses (LPNs), medical assistants (MAs), nurse practitioners (NPs), physician assistants (PAs), and a medical doctor (MD).

Patient education is heavily emphasized in this practice. Education is provided by all members of the healthcare team, however, the RNs, LPNs, and MAs are typically the main providers of education to the patients. When an inhaler is initially prescribed to a patient during an office visit, the RNs, LPNs, and MAs are often looked upon to provide the patient education on inhaler use. However, the office does not offer standardization or a systemic way of teaching and assess inhaler technique in patients. This quality improvement project focused on increasing the ability and confidence of HCPs to teach and assess inhaler technique to patients, as it is recommended by the GOLD (2018) and GINA (2018) global guidelines.

Review of Literature

Literature Search Methods

A review of literature was conducted searching databases PubMed and Cumulative Index of Nursing and Allied Health Literature (CINAHL). Search terms used in all databases included phrases used solely or in combination with one another were “*inhaler*,” “*technique*,” “*education*,” “*selection*,” and “*teach-back*.” Inclusion criteria included full text articles written in English, published between 2013 to 2018. Exclusion criteria included articles that focused on pediatric patients, and duplicate articles within databases. Article titles within databases were

reviewed for articles based upon search phrases and relevance to the DNP project. Articles that were considered relevant to the DNP project included those that discussed inhaler technique, issues related to inhaler technique, methods of teaching inhaler technique, and HCP's knowledge of inhaler technique.

Articles that were not considered relevant included those that focused solely on a particular pharmaceutical inhalation device. Many of the articles researched investigated metered dose inhalers, as this is the most commonly prescribed inhaler to asthma and COPD patients. A total of ninety-five article titles were considered, and fifty-two article abstracts were reviewed to further evaluate consideration for inclusion. This was further narrowed down by reading thirty-six articles in full. Based upon inclusion and exclusion criteria and a total of fourteen articles were included in this review. Articles were evaluated using Johns Hopkins Nursing Evidence-Based Practice Evidence Level and Quality Guide (Level I A- V C) (Appendix A).

Literature Search Results

Healthcare professionals are often responsible for providing inhaler education to patients; however, many HCPs lack the knowledge of inhaler use. Patients are frequently found to use inhalers incorrectly, which can put their disease state at risk for worsening symptoms. The teach-back method is a teaching implementation HCPs can use as a standard method of teaching and assessing inhaler technique in patients.

Healthcare professionals' lack of knowledge of inhaler technique. Healthcare professionals play a vital role in teaching patients inhaler technique, yet research has demonstrated that many HCPs are not sufficiently educated on using inhalers (Alismail et al., 2016). Alismail et al. (2016) researched HCPs knowledge of specific inhaler devices and their

ability to retain the knowledge after a training intervention (Level II B). The researchers found that a suboptimal number of HCPs have proper knowledge and skills to teach techniques of different inhaler devices (Alismail et al., 2016). Basheti, Qunaibi, Hamadi, and Reddel (2014) also investigated HCPs ability to use inhalers and the long and short-term effects of a single educational program (Level II A). The researchers found that at baseline, all HCPs scored poorly in demonstrating correct technique of DPI compared to pMDI. Healthcare professionals who attended the educational program demonstrated significantly improved skills in both short and long-term demonstration of inhaler technique (Basheti et al., 2014). Nurses are key to providing patient education. Tratto et al. (2014) specifically researched nurses' knowledge of inhaler technique in an inpatient hospital setting (Level III B). Overall rates of misuse were found to be high among nurses, 82% for the Diskus device, and 92% for pMDI. Poor correlation between self-perceived ability to use devices and the investigators' checklist assessments were also demonstrated (Tratto et al., 2014).

Tratto et al. (2014) also found that 80% of nurses reported providing inhaler teaching during hospitalization. The education that HCPs receive on disease state and inhaler technique of various devices is also problematic. Basheti, Hamadi, and Reddel (2016) explored HCPs asthma knowledge and inhalation technique skills (Level II A). The researchers found that many HCPs never received education on inhaler technique, with 32.67% of nurses, 48.33% of general practitioners, and 52.67% of pharmacists (Basheti et al., 2016). The study demonstrated a strong association between inhaler technique and asthma knowledge (Basheti et al., 2016).

Inhaler use errors. Incorrect use of inhalers is one of the leading factors that contributes to suboptimal control of asthma and COPD and has been associated with worsened health outcomes (Gregoriano et al., 2018). In a research study by Gregoriano et al. (2018) (Level I A)

asthma and COPD patients were analyzed on correct inhaler application, quality of life, symptom control, and spirometry. Incorrect inhaler technique ranged from 0% to 53%, depending on the inhaler type, with metered dose inhalers demonstrating the highest rates of incorrect use (Gregoriano et al., 2018). Chronic obstructive pulmonary disease patients with incorrect inhaler use had higher COPD Assessment Test scores, were more likely to suffer from cough, and more breathless when walking uphill or a flight of stairs compared to those with correct use (Gregoriano et al., 2018). Chronic obstructive pulmonary disease patients who used their devices correctly had significantly better mean forced expiratory volume in one second (FEV1) scores at baseline compared to those who used their devices incorrectly (Gregoriano et al., 2018). There were no differences found with device application in asthma patients' quality of life, symptom control, and lung function. Conversely, Price et al. (2018) (Level III A) found that inhaler errors were significantly associated with asthma symptom control. Insufficient inspiratory effort was most commonly identified and associated with uncontrolled asthma and increased rate of exacerbations with DPI (Price et al., 2018). Actuation before inhalation with MDIs was most commonly associated with uncontrolled asthma (Price et al., 2018). Authors Ocakli et al. (2018) examined more specifically inhaler technique errors between asthma and COPD patients in a cross-sectional, observational study (Level III B). Patient currently using at least one inhaler device were evaluated on inhaler technique (Ocakli et al., 2018). The authors found failure to exhale before inhaling was the most common error for both COPD and asthma patients (Ocakli et al., 2018). Device specific errors and poor inhaler technique was found to be more common in asthma patients compared to COPD patients. (Ocakli et al., 2018).

Matching inhalers to patients. Healthcare professionals that use a shared care approach, which accommodates patient goals and preferences, and comprehensive patient education with

device training can improve outcomes in asthma and COPD patients (Kaplan & Price, 2018). However, even with proper training, some devices are unsuitable to patients (Kaplan & Price, 2018). Ensuring a match of the right device for the right patient is critical for HCPs to evaluate when first prescribing a device and at regular monitoring and training of device use (Kaplan & Price, 2018). In a study by Jahedi et al. (2017) patient preferences and attitudes toward inhaler devices in asthma patients was investigated (Level III B). The researchers used interviews and questionnaires about satisfaction and preference of inhaler devices, and objective assessment of inhalation technique was also performed (Jahedi et al., 2017). The researchers found that all patients were somewhat satisfied with their devices, regardless of technique (Jahedi et al., 2017). However, only 12% of devices were correctly used, despite most patients having confidence in technique (Jahedi et al., 2017). The authors also found that most patients were not involved in the decision process of their device (Jahedi et al., 2017) Study participants conveyed a trusting relationship with their prescribing physicians and did not believe that device selection contributed to asthma treatment or control (Jahedi et al., 2017).

Authors Miravittles et al. (2018) studied the factors for inhaler device choice by physicians in patients with COPD (Level III C). The author surveyed pulmonologists and found selection of a device is relevant, however, 62.5% prioritized selection of the drug over device selection (Miravittles et al., 2018). The main aspects in considering device selection was patient experience (89.6%), ability to handle device (97.9%), coordination (96.9%), ability to learn (87.5%), and adherence (84.4%) (Miravittles et al., 2018). With many different devices available for prescribers to choose from, HCPs should discuss options with patients and select the most appropriate device for each individualized patient.

Teach-back method. An intervention known as the teach-back method has been studied as a method to help patients master inhaler technique (Dantic, 2014). Dantic (2014) performed a critical review of literature assessing the teach-back method and inhaler technique in COPD patients (Level III A). In the studies reviewed, 24% to 94% of patients did not use their inhalers correctly (Dantic, 2014). After implementation of the teach-back method, correct inhaler technique significantly improved in all studies compared to control groups (Dantic, 2014). In addition, Dantic (2014) found that the teach-back method demonstrated long term effects, and can help overcome potential barriers with technique, such as age, gender, use of multiple devices, and vision.

Authors Samuels-Kalow, Hardy, Rhodes, and Mollen (2016) researched the teach-back method in relation to health literacy in asthma patients (Level II C). The authors found that regardless of health literacy, study participants felt that the teach-back method would help confirm learning and avoid forgetting information (Samuels-Kalow et al., 2016). Despite this overall finding, the researchers noted that some participants with adequate literacy felt the teach-back method was unnecessary (Samuels-Kalow et al., 2016). Some participants also expressed concerns about feeling nervous to show a lack of understanding to their providers and felt as though they were being judged (Samuels-Kalow et al., 2016).

Researchers Press et al. (2016) evaluated the effects of a teach-back method, called teach-to-goal (TTG), versus a brief verbal instruction (BI) in asthma and COPD patients (Level I A). Participants received one of the two education training strategies while hospitalized and were evaluated after discharge (Press et al., 2016). Before intervention, use of MDI's was similar across both groups, and misuse was not significantly less in either group at thirty days post-intervention (Press et al., 2016). Immediately after education and at ninety days post education,

the TTG group demonstrated significantly less misuse compared to BI (Press et al., 2016).

Adherence at thirty and ninety days did not differ across education groups, however acute care events were less common in the TTG group compared to the BI group (Press et al., 2016).

Low health literacy patients receiving TTG were less likely to report acute care events within thirty days compared to the BI group (Press et al., 2016). Al-Kalaldeh, El-Rahman, and El-Ata (2016) researched a nurse education intervention to assess patient inhaler use (Level II B). The nurses provided education to patients on the inhalers and were asked to demonstrate the skills taught (Al-Kalaldeh et al., 2016). The researchers found that patients' ability to perform proper inhaler technique and compliance with therapy significantly improved after the nurse driven inhaler educational program (Al-Kalaldeh et al., 2016).

Evidence Based Practice: Verification of Chosen Option

Issues related to inhaler technique are strongly supported in the literature. Inhaler use errors are associated with poor health outcomes in asthma and COPD patients. Insufficient knowledge of inhaler technique by HCPs contributes to inhaler use errors as HCPs are responsible for teaching patients' proper technique. Also, not adequately matching the proper inhaler to individual patients has been found to contribute to technique issues. Patients must be properly assessed by the healthcare team at time of initial prescription and at subsequent monitoring and training sessions to determine if the patient is able to use the device.

A shared care approach that incorporates patient preference and goals can help HCPs match devices to patients. The teach-back method has proven to be an effective nursing intervention to help patients master inhaler technique. This method improves patients' ability to

perform inhaler technique, and also improves compliance. Teaching patients' proper inhaler technique can improve disease control in asthma and COPD patients.

Theoretical Framework

The theoretical framework used to guide this DNP project is the Planned Change Theory that was introduced by Kurt Lewin in 1951 (Appendix B) (McEwen & Wills, 2014). Lewin's theory describes the process of planned change, which occurs by design, and not by spontaneous action (McEwen & Wills, 2014). When the Planned Change Theory is used correctly by a group or system, there is implementation of effective change (McEwen & Wills, 2014). Lewin describes the concepts of field and force in his theory (McEwen & Wills, 2014). A field can be viewed as a system, and when one part of the system undergoes change, the whole system is examined to determine the effect of change (McEwen & Wills, 2014). The force is a direct entity which has characteristics of focus, strength and direction (McEwen & Wills, 2014). Lewin describes that moving from the status quo and disequilibrium of the balance between opposing forces creates change (McEwen & Wills, 2014).

Lewin describes two forces involved in change, driving forces and restraining forces (McEwen & Wills, 2014). A driving force encourages and facilitates change by movement to a new goal, outcome, or direction, whereas a restraining force impedes the progress towards the goal (McEwen & Wills, 2014). In this DNP project the driving force were identified as medical director of the primary care office. The medical director encouraged implementation of this project to improve inhaler technique among asthma and COPD patients. The restraining force identified in this DNP project were identified as the HCPs in the office that may have been resistant to change in their daily activities. Lewin describes the return to equilibrium by balancing opposing forces as effective change (McEwen & Wills, 2014).

There are three phases that Lewin has identified for planned change to be successful (McEwen & Wills, 2014). In the first phase, unfreezing the status quo, individuals must be informed and agree of the need for change (McEwen & Wills, 2014). In this DNP project, the unfreezing phase occurred when the DNP student discussed the need for change in assessing and teaching patient inhaler technique with the medical director and HCP staff. The medical director and select HCP staff agreed that there is a need within the practice to improve the HCPs ability to teach and assess inhaler technique. In the second phase, moving to a new state, driving forces should exceed restraining forces, and the initiator should recognize that change takes time, should be gradually accomplished, and planned in a thoughtful and comprehensive manner prior to implementation (McEwen & Wills, 2014).

In this DNP project, the second phase was demonstrated when medical director recognized the need for implementation of this project, exceeding resistance by staff HCPs. The implementation is planned in a thoughtful, comprehensive manner to implement teachings into everyday use with patients. Changes takes time and appropriately planned to evaluate the effect of change after implementation of the in-service learnings. The third phase, refreezing, is where stabilization occurs, and if successful change is integrated into the system (McEwen & Wills, 2014). The DNP student measured whether stabilization occurred after the educational in-service to determine if the HCPs would integrate the learnings into their teaching and assessing of inhaler technique through pre and post-intervention survey analysis.

Goals, Objectives and Outcomes

The goal for this DNP project was to improve the ability and confidence among HCPs to teach and assess inhaler technique to patients. This goal was addressed by providing education to

HCPs about asthma and COPD disease states, providing education about inhaler technique, teach-back method skills to teach inhaler technique, and matching inhalers to patients.

The goal of improved ability and confidence to teach and assess inhaler technique among HCPs was measured with participants completing pre- intervention, immediate post-intervention, and four-week post-intervention surveys to demonstrate if there was improvement in their self-reported ability and confidence after receiving the educational in-service intervention. The project goal was specific, measurable, assignable, realistic, and time-specific:

- Specific: improved knowledge of inhaler technique education by educating HCPs about asthma and COPD disease states.
- Measurable: improved ability and confidence to teach and assess inhaler technique was measured by self-reported surveys.
- Assignable: The DNP student was responsible for coordinating and leading the educational in-service intervention and collecting and analyzing surveys.
- Realistic: This DNP project was intended to improve HCPs ability and confidence in teaching and assessing inhaler technique to patients over a scheduled in-service meeting. Pre and post surveys provided were user and time friendly. Improving HCPs ability and confidence to teach and assess inhaler technique did not involve new technology and did not create drastic changes in daily work routines.
- Time-specific: The pre-intervention survey, educational in-service intervention, and immediate post-intervention surveys were provided over a one-hour in-service meeting. The DNP student coordinate time for completion of the four-week post-intervention surveys at the project site four weeks following the educational in-service intervention.

Methods

The Quality Improvement framework by the Health Resources and Services Administration (2011) was used to design and lead this quality improvement project to improve HCPs ability and confidence to teach and assess inhaler technique. Quantitative and qualitative data was analyzed from pre and post surveys to determine if HCPs ability and confidence to teach and assess inhaler technique improved following the educational in-service intervention.

Ethical Considerations/ Protection of Human Subjects

The University of Massachusetts, Amherst (UMass) Internal Review Board (IRB) approval was obtained prior to initiating the DNP project. The official IRB Determination Form was submitted July 30, 2019. The project received IRB approval August 2, 2019 (Appendix G). There was no direct patient contact within this project. Human subjects used in this project included clinical site RNs, LPNs, MAs, NPs, PAs, and an MD. There was no risk to the human subjects involved in the project, or to the DNP student during the project. No patient records or information were accessed or discussed during this project. Surveys were anonymous and only included clinical title (RN, LPN, MA, NP, PA, MD) as personal data information. All participants were assigned a number that correlated and allowed for comparison of pre and post-intervention surveys. All data was stored at the home of the DNP student on a locked computer.

Implementation

The implementation site of the DNP project was an independent primary care office located in Massachusetts. Services offered at this office include annual physical exams, urgent sick visits, care of chronic conditions, and post hospital care. The office RNs, LPNs, MA, NPs, PAs, and an MD. The office operates in model in which the advanced practitioners and medical doctor

make treatment decisions while the RN, LPN, or MA remains in the room during the patient visit. The RN, LPN, or MA documents in the electronic medical record during the patient visit and provides patient education before and after the advanced practitioner enters and leaves the room.

The medical director assisted the DNP student in recruitment of the RNs, LPNs, MAs, NPs and PAs by holding a meeting in which the DNP student provided the educational in-service to the HCPs. Inclusion criteria for this project includes RNs, LPNs, MAs, NPs, PAs, and MDs employed by the primary care office who provide direct patient care. Exclusion criteria for this project includes staff that are not healthcare professionals described above.

Setting facilitators and barriers. Facilitators of this DNP project included the medical director who offered his support in improving the staff HCPs ability and confidence to teach and assess inhaler technique to patients. Barriers with this project included HCPs resistance to change. A scheduled visit with a patient is typically thirty minutes for physical and fifteen minutes for all other visits. The HCPs felt as though they may not have enough time to teach and assess inhaler technique during a typical scheduled visit. The DNP student overcame this barrier though the educational in-service in which the importance of inhaler technique was discussed, and it was emphasized how it is crucial to patient care and it can be efficiently accomplished.

Intervention and Data Collection Procedures

This project was conducted in three phases:

Phase 1: Pre-intervention surveys were completed on September 20, 2019;

Phase 2: Educational in-service intervention and immediate post-intervention surveys were completed on September 20, 2019;

Phase 3: Four-week post-intervention surveys were completed on October 18, 2019.

The outcomes of this DNP Project were measured using the following instruments: a pre-intervention survey, an immediate post-intervention survey, and a four-week post-intervention survey created by the DNP student to measure HCPs ability and confidence to teach and assess inhaler technique (Appendix E). The survey questions were measured in a pre-post intervention fashion. The surveys were anonymous, individual and self-reported.

The pre-intervention (Phase 1) and intervention (Phase 2) phases of this project occurred on September 20, 2019. Participants of the pre-intervention (Phase 1) included one MA, four RNs, two LPNs, two NPs, and one MD. During the pre-intervention the DNP student asked the participants to fill out the pre-intervention survey to assess the HCPs previous training on inhaler technique, how and how often inhaler technique is taught and assessed to patients, common patient errors observed with inhaler use, and the HCPs confidence and ability to teach and assess inhaler technique.

After the HCPs completed the pre-intervention surveys, the DNP student provided lunch for the HCPs. During lunch, the DNP student presented the intervention portion (Phase 2) of the project to all of those who participated in the pre-intervention survey. During the intervention, the DNP student presented a twenty-minute PowerPoint presentation (Appendix D), which was created by the DNP student to provide brief information on asthma and COPD disease states, inhaler technique information with current research, and teach-back implementation. The HCPs were provided a copy of the PowerPoint slides the DNP student also created a booklet of supplemental reference materials for the office that referenced matching inhalers to patients, different inhaler types and categories, step by step directions of common inhalers, and using the teach-back method (Appendix F).

During phase 2, the DNP student provided an immediate post-intervention survey following the educational in-service intervention to assess what the participants found valuable from the presentation, if they are more likely to spend time teaching and assessing inhaler technique with patients, and how they plan to implement their learnings into routine patient care. Participant HCPs that completed the immediate post-intervention surveys included one MA, three RNs, two LPNs, two NPs, and one MD.

Four weeks following the intervention (Phase 2), on October 18, 2019, the DNP student returned to the project site and supplied lunch to the participants. The DNP student provided the available participating HCPs with a four-week post-intervention survey (Phase 3) to measure the HCPs ability and confidence in teaching and assessing inhaler technique and use of the teach-back method. HCPs that participated in the four-week post-intervention surveys included one MA, three RNs, two LPNs, one NP, and one MD.

The total accrued costs accounted for in this project was \$532.72 (Appendix C). The DNP student provided lunch to the participants during the intervention and four-week post-intervention phases of this project. Surveys, PowerPoint slides, and reference materials were printed by the DNP student and provided to the implementation site to keep as reference materials.

Data analysis. The DNP student created three surveys: a pre-intervention, immediate post-intervention, and a four-week post-intervention survey. The surveys included open ended questions and five-point Likert scale questions with response values to each question. A Likert response value of one corresponded to the most negative response, and a response value of five indicated the most positive response. For example, a score of 1 represented not confident, where as a score of 5 represented very confident. Three survey questions were repeated in the pre-

intervention and the four-week post-intervention surveys. These questions were used to evaluate changes in the participants' ability and confidence to utilize the teach-back method pre-intervention and four-weeks post-intervention, as detailed in Table 1. Due to the small sample size and limitations of this project, the statistical significance of these improvements was not able to be tested. However, clinical significance is discussed. Additionally, qualitative data from open ended questions were reviewed and common themes were identified in the pre-intervention, immediate post-intervention, and four-week post-intervention surveys.

Results

In analyzing the data collected in this project, it was found that many HCPs have never been trained on proper inhaler technique. Participants in the project were astonished by the statistics of improper patient inhaler use, although they stated they do believe it is a major problem in healthcare and there is a need for improvement. This project was well received and supported by the participant HCPs. The DNP student found that the participant HCPs ability and confidence to teach and assess inhaler technique improved following the educational intervention. Additionally, the HCPs found the teach-back method to be a useful way to teach and assess inhaler technique with patients.

Ten HCPs from the project site primary care office participated in the pre-intervention surveys, nine in the post-interventions surveys (dropout rate 10%), and eight in the four-week post-intervention surveys (dropout rate 20%). In the pre-intervention surveys, the HCPs included one MA, four RNs, two LPNs, two NPs, and one MD. The post-intervention surveys included one MA, three RNs, two LPNs, two NPs, and one MD. The four-week post-intervention surveys included one MA, three RNs, two LPNs, one NP, and one MD.

Qualitative Results

The qualitative data was analyzed by the DNP student using Microsoft Excel. The DNP student placed the collected data into a spreadsheet to review responses and comments. In analyzing the qualitative data, common themes emerged from the open-ended questions in the surveys. The common themes will be discussed based upon the pre-intervention, immediate post-intervention, and four-week post-intervention surveys, according to the identified themes.

Pre-intervention. Prior to the intervention, the participants were asked open ended questions in the pre-intervention surveys. Two common themes emerged from the pre-intervention surveys. These themes included a lack of formal inhaler education, and a lack of reviewing inhaler technique at each office visit.

Theme: A lack of formal inhaler education. During the pre-intervention, the DNP student noted a wide variation in the participants' education on inhaler technique. The participants were asked "Have you ever been given formal education on teaching proper inhaler technique," and of the ten participants, only four answered "Yes." Of the participants that responded yes, the time frame included one of the NPs reporting one week ago, one of the RNs reporting five years ago, the MD reporting fourteen years ago, and one LPN reporting six years ago. The participants discussed with the DNP student the challenges of the rapidly changing inhalation device market and the difficulties with being able to sustain their knowledge of different device techniques.

Theme: A lack of reviewing inhaler technique at each office visit. Prior to the formal educational in-service, the participants expressed that they believe inhaler misuse among patients is a major problem in healthcare. In the survey, the participants were asked "Do you review

inhaler technique with patients at each visit, and if not, how often.” Responses included “No. Only when prescribed,” “No. Review when we are starting patient on inhaler and give patient a sample,” and “Not every visit. With initiation of medication.” The participants noted in conversation with the DNP student that they do not ask patients to bring their inhalers in at each visit and often do not assess technique after the initial prescription. The participants expressed that time constraints during office visits account for not being able to teach an assess technique at subsequent office visits.

Immediate Post-intervention. After implementing the intervention, the participants were given post-intervention surveys. Two common themes were identified in the post-intervention surveys, which included patient learning deficits and use of the teach-back method.

Theme: Patient learning deficits. During the intervention, the DNP student reviewed statistics of inhaler misuse with the participants. The participants found this information to be compelling information, stating it to be one of the most valuable pieces of information they received from the intervention. Some of the participants responses when asked “What is the most valuable piece of information you found?” included “The amount of learning deficient in the patient population,” “How prevalent inhaler misuse is.” The participants noted that the statistics made them realize the importance of teaching and assessing inhaler technique, with one participant stating “[The] importance of reviewing use at office visit- have patients bring in inhalers.”

Theme: Use of the teach-back method. As a method of teaching and assessing inhaler technique to patients, the DNP student introduced the teach-back method to the participants during the intervention. The participants were asked “How do you plan to utilize the information you learned into your routine plan of care for patients?” Responses included “Request they bring

inhalers in for assessment; print out more written material,” “Will plan to use appropriate demonstration and teach back methods,” and “Ask patients about inhaler use. Request they bring in inhalers to appointment to demonstrate.” The participants expressed to the DNP student that they believe the teach-back method is a great way to teach and assess inhaler technique among patients, and patients should receive handouts, such as check lists, to learn inhaler technique.

Four-week post-intervention.

Four weeks following the intervention, the participants were asked one last open-ended question in the four-week post-intervention survey. A common theme identified was having patients bring inhalers to office visits and using the teach-back method.

Theme: Office visits and use the teach-back method. The participants expressed that the information presented in the intervention made them rethink how they are treating their asthma and COPD patients. The participants were asked “How have these learning changed the way you teach and assess inhaler technique?” Responses included “Making sure to review method of using inhaler even if not a new script,” “Need to remind patients to bring in inhalers,” and “I have a better understanding of using the teach back method to assess patient’s understanding.” One of the RNs stated to the DNP student that since the intervention the MD has requested that the nurses use the teach-back method to teach patients how to use inhalers and has requested that patients bring in their inhalers at subsequent visits.

Quantitative Results

In order to evaluate changes in ability, confidence, and utilization of the teach-back method as a result of the educational in-service intervention, the means of three repeated

questions were calculated and compared using Microsoft Excel at the two measured time points as depicted in Table 1.

Table 1

Means of Pre and Four Week Post Test Survey Results

Question	Mean		Difference
	Pre-Intervention	Four-Week Post-Intervention	
How confident are you teaching and assessing inhaler technique to patients?	3.2	3.9	+0.8
How often do you utilize the teach-back method when teaching inhaler technique?	3.1	4.1	+1
How would you rate your ability to teach and assess inhaler technique?	2.7	4	+1.3

The first Likert question “How confident are you teaching and assessing inhaler technique to patients?” represented a mean of 3.2 (neutral) in the pre-intervention survey, and a mean of 3.9 (neutral) in the four-week post-intervention survey. As depicted in Figure 1, of the participants involved in the pre-intervention survey, two participants reported feeling not

confident, three reported feeling neutral, four reported feeling confident, and one reported feeling very confident. In the four-week post-intervention survey, seven of participants reported feeling confident, and one reported feeling neutral. The mean difference between the pre-intervention and four-week post-intervention surveys was 0.8, demonstrating an improvement in confidence to teach and assess inhaler technique to patients following the educational in-service.

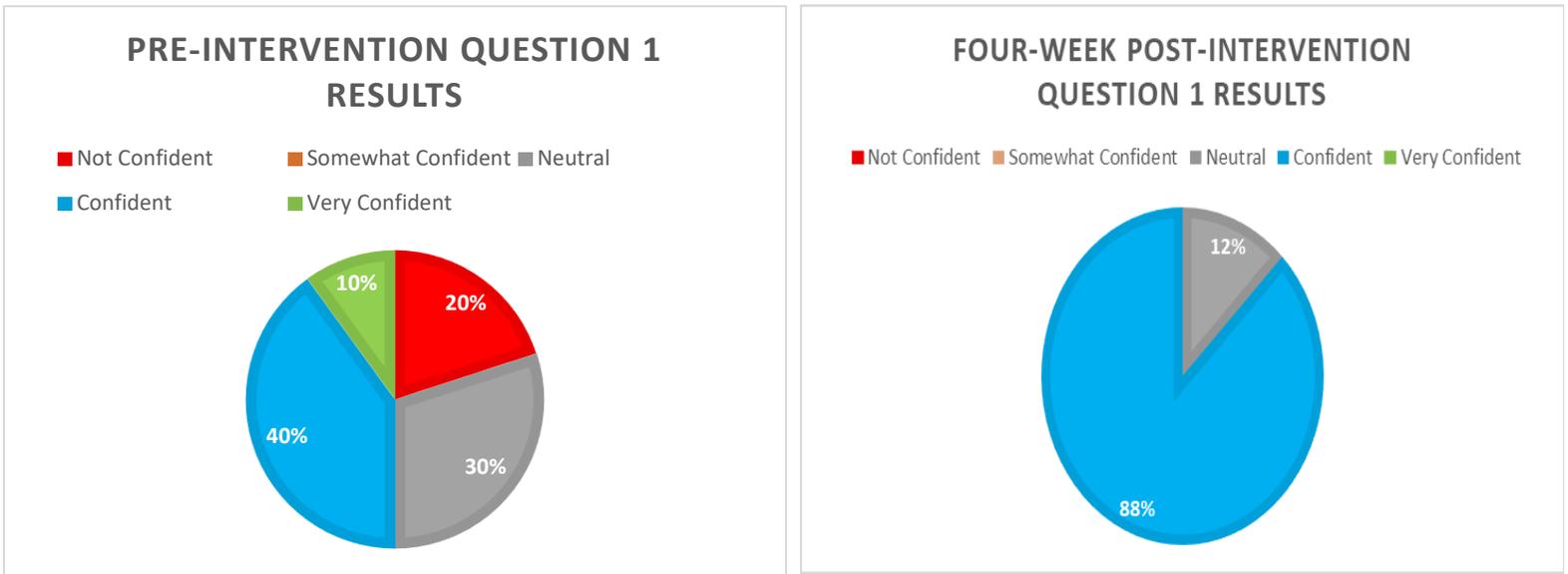


Figure 1. How confident are you teaching and assessing inhaler technique to patients?

The second Likert question, “How often do you utilize the teach-back method when teaching inhaler technique?” represented a mean of 3.1 (neutral) in the pre-intervention survey, and a mean of 4.1 (somewhat confident) in the four-week post-intervention survey. Figure 2 displays that in the pre-intervention surveys, three of the participants reported using teach-back to teach inhaler technique 0% of the time, one reported about 25% of the time, one reported about 50% of the time, two reported about 75% of the time, and three reported 100% of the time. Figure two also displays that in the four-week post-intervention survey, one participant reported using the teach-back method about 50% of the time, five reported about 75% of the time, and

two reported 100% of the time. The mean difference was 1, demonstrating increased utilization of the teach-back method when teaching inhaler technique following the educational in-service. The positive improvement in the mean difference represents that the HCPs increased the use of teach-back during patient office visits.

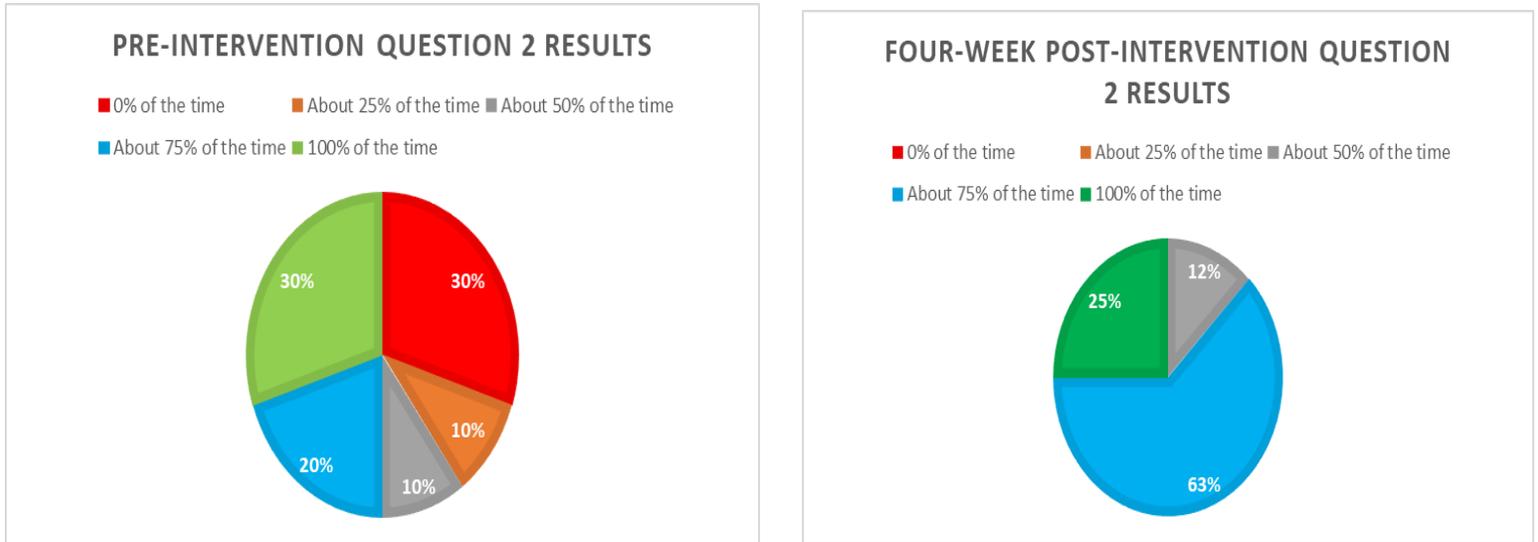


Figure 2. How often do you utilize the teach-back method when teaching inhaler technique?

The last Likert question, “How would you rate your ability to teach and assess inhaler technique?” represented a mean of 2.7 (needs improvement) in the pre-intervention survey, and a mean of 4 (good) in the four-week post-interventions survey. Figure 3 demonstrates that in the pre-intervention survey, two participants reported their ability to teach and assess inhaler technique as not good, two reported needs improvement, two reported neutral, and three reported good. Figure 3 also depicts eight of participants reported their ability to each and assess inhaler technique as good during the four-week post-intervention survey. The mean difference was 1.3,

demonstrating a clinically significant improvement in ability to teach and assess inhaler technique following the educational in-service.

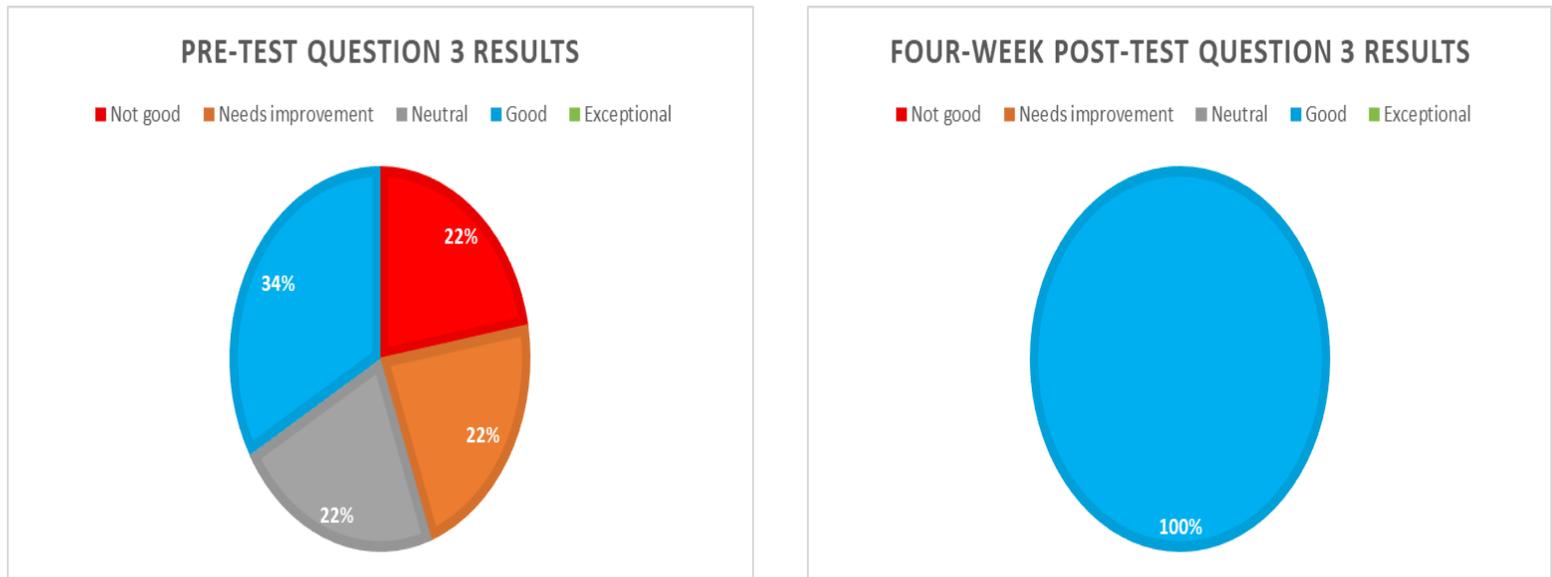


Figure 3. How would you rate your ability to teach and assess inhaler technique?

Discussion

The purpose of this quality improvement project was to increase HCPs ability and confidence to teach and assess inhaler technique in asthma and COPD patients. While statistical significance could not be evaluated due to the small sample size of participants, clinical significance can be inferred. In the quantitative data, there was an improvement in the mean scores of all three of the Likert questions between the pre-intervention and four-week post-intervention surveys. This suggests that the HCPs were more confident teaching and assessing inhaler technique, utilizing the teach-back method, and had an increased ability to teach and assess inhaler technique following the intervention.

Of the ten participants in the pre-intervention survey, only four had reported ever receiving formal inhaler training. This supports the findings from the literature review that many HCPs are not sufficiently trained on inhaler technique (Alismail et al., 2016), which could be a contributing factor to poor patient inhaler technique. Participants found the statistical data of inhaler misuse to be very compelling and this demonstrated a need for the intervention presented in the DNP project. Additionally, HCPs do not teach and assess inhaler technique on a regular basis (Price et al., 2018). In this DNP project, this was evident as the majority of the participants reported only training patients on inhaler technique at the time of initial prescription. As the GOLD (2018) and GINA (2018) guidelines recommend, inhaler technique should be assessed on a regular basis. Many HCPs neglect to assess inhaler technique at subsequent visits after the initial prescription. In the four-week post-intervention survey, many of the HCPs responded that one of the key learnings they received from the intervention was to remind patients to bring in inhalers at subsequent office visits. The participants also found value in using the teach-back method and reported an increased use in this method since the intervention. This is consistent with previous finding that the teach-back method is a useful intervention that offers long term effects and can help overcome potential barriers with device technique (Dantic, 2014).

Applying the theory of Kurt Lewin's Planned Change Theory helped guide this DNP project. As Lewin describes in his theory, a driving force was identified as the medical director of the project site, who recognized the need for this project. The restraining forces were identified as the HCPs who had some resistance to change, mostly due to lack of time with patients. The three phases described by Lewin, unfreezing the status quo, moving to a new state, and refreezing were reflected in this DNP project. With the support of the medical director and statistical data provided to the HCPs on inhaler misuse, the participating HCPs recognized the

need for change and accepted the teachings provided in the intervention. The changes were successfully integrated into the system and stabilization was achieved as evidence by the survey analysis results.

Limitations

Limitations were also identified in this project. The sample size of the participating HCPs was small and not all the original participants in the pre-intervention surveys completed the post-intervention and four-week post-intervention surveys, with a dropout rate of 10% and 20% respectively. Due to the limited sample size, statistical significance could not be evaluated. Although statistical significance could not be evaluated, it is possible that the improvements observed in the pre/post questions were due to chance or error. However, the qualitative data collected supported the conclusion that there were improvements in the HCPs ability and confidence to teach and assess inhaler technique in asthma and COPD patients.

Conclusion

Improper inhaler technique among asthma and COPD patients has been extensively demonstrated in literature. Global guidelines recommend the use of inhaled medications to decrease symptoms and exacerbations and improve quality of life and lung function, however poor technique can lead to suboptimal disease control. Healthcare professionals are essential in teaching, evaluating, and assessing inhaler technique, yet many HCPs are not adequately trained on proper inhaler technique. This DNP project provided training to primary care HCPs on disease state, inhaler technique, and teaching and assessing inhaler technique. The HCPs were trained how to teach and assess inhaler technique with the implementation of the teach-back method to effectively train patients on how to use inhalation devices. This DNP project

anecdotally supports the findings in literature that many HCPs have never had formal education on inhaler technique and do not review inhaler technique at subsequent visits after the initial prescription. These findings support the need for future research in the area of HCPs teaching and assessing inhaler technique as recommended by global asthma and COPD guidelines. This project demonstrated the importance of HCPs knowledge of inhaler technique to be able to confidently teach inhaler technique to patients.

The teach-back method proved to be an effective intervention for HCPs to teach and assess inhaler technique to patients and appropriately match inhalers to patients. As discussed in the review of literature, previous studies have demonstrated that when HCPs use the teach-back method to teach and assess inhaler technique, improvement in technique and compliance have been observed. Due to the short time frame of this project, not all of the HCPs were able to assess improvements in technique and compliance in their patient populations. Despite this, the findings of this study supported the HCPs willingness and support to implement the teach-back method in practice.

Future actions and steps that could be beneficial to sustain and further expand on the findings of this project would include a project with more participants. This could be beneficial in being able to determine if statistical significance would be achieved. Also, a project with a longer duration would be beneficial so that all participants are given the opportunity to use the teach-back method with patients. In clinical practice, the DNP student plans to utilize the teach-back method with all patients prescribed inhalers. The DNP student will encourage all colleagues to use this method to teach and assess inhaler technique at every office visit. As asthma and COPD are diseases that are often managed in primary care, the DNP student will act as a leader

to bring knowledge from the finding of this project into primary care to create a change in the management of asthma and COPD patients.

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Appendix A

Johns Hopkins Nursing Evidence-Based Practice: Evidence Level and Quality Guide

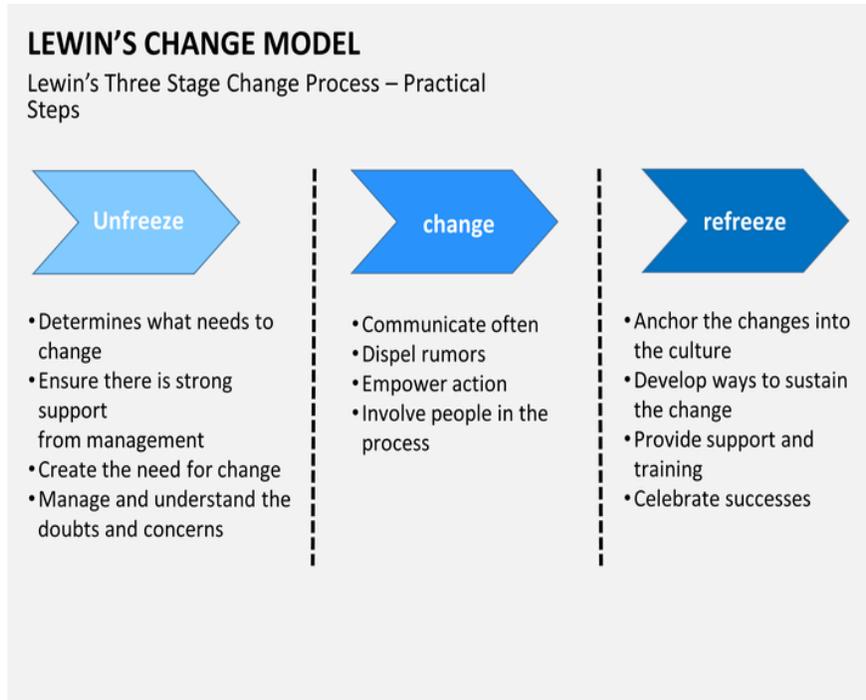
Evidence Levels	Quality Guides
<p>Level I Experimental study, randomized controlled trial (RCT) Systematic review of RCTs, with or without meta-analysis</p>	<p>A High quality: Consistent, generalizable results; sufficient sample size for the study design; adequate control; definitive conclusions; consistent recommendations based on comprehensive literature review that includes thorough reference to scientific evidence</p> <p>B Good quality: Reasonably consistent results; sufficient sample size for the study design; some control, fairly definitive conclusions; reasonably consistent recommendations based on fairly comprehensive literature review that includes some reference to scientific evidence</p> <p>C Low quality or major flaws: Little evidence with inconsistent results; insufficient sample size for the study design; conclusions cannot be drawn</p>
<p>Level II Quasi-experimental study Systematic review of a combination of RCTs and quasi-experimental, or quasi-experimental studies only, with or without meta-analysis</p>	
<p>Level III Non-experimental study Systematic review of a combination of RCTs, quasi-experimental and non-experimental studies, or non-experimental studies only, with or without meta-analysis Qualitative study or systematic review with or without a meta-synthesis</p>	

<p>Level V Based on experiential and non-research evidence</p> <p>Includes:</p> <ul style="list-style-type: none"> Literature reviews Quality improvement, program or financial evaluation Case reports Opinion of nationally recognized experts(s) based on experiential evidence 	<p>Organizational Experience:</p> <p>A High quality: Clear aims and objectives; consistent results across multiple settings; formal quality improvement, financial or program evaluation methods used; definitive conclusions; consistent recommendations with thorough reference to scientific evidence</p> <p>B Good quality: Clear aims and objectives; consistent results in a single setting; formal quality improvement or financial or program evaluation methods used; reasonably consistent recommendations with some reference to scientific evidence</p> <p>C Low quality or major flaws: Unclear or missing aims and objectives; inconsistent results; poorly defined quality improvement, financial or program evaluation methods; recommendations cannot be made</p> <p>Literature Review, Expert Opinion, Case Report, Community Standard, Clinician Experience, Consumer Preference:</p> <p>A High quality: Expertise is clearly evident; draws definitive conclusions; provides scientific rationale; thought leader(s) in the field</p> <p>B Good quality: Expertise appears to be credible; draws fairly definitive conclusions; provides logical argument for opinions</p> <p>C Low quality or major flaws: Expertise is not discernable or is dubious; conclusions cannot be drawn</p>
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Evidence Levels	Quality Guides
<p>Level IV Opinion of respected authorities and/or nationally recognized expert committees/consensus panels based on scientific evidence</p> <p>Includes:</p> <ul style="list-style-type: none"> Clinical practice guidelines Consensus panels 	<p>A High quality: Material officially sponsored by a professional, public, private organization, or government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years</p> <p>B Good quality: Material officially sponsored by a professional, public, private organization, or government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results, sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise is clearly evident; developed or revised within the last 5 years</p> <p>C Low quality or major flaws: Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies, insufficient evidence with inconsistent results, conclusions cannot be drawn; not revised within the last 5 years</p>

Appendix B

Theoretical Framework



Appendix C

Cost- Benefit Analysis

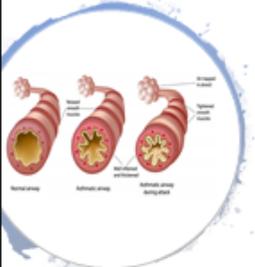
Item	Cost
Lunch	\$482.72
Survey printing	\$10
PowerPoint and reference printing	\$40
Total Project Cost	\$532.72

Appendix D

PowerPoint Presentation

Improving Inhaler Technique in Asthma and COPD Patients

Dr. Caitlin M. Crowley
University of Massachusetts Amherst



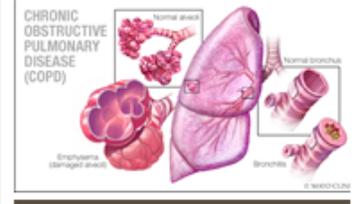
Asthma

- Estimated 300 million people suffer worldwide
- Symptoms: wheezing, SOB, chest tightness, and cough
 - Associated with difficulty breathing due to bronchoconstriction, airway wall thickening, and mucus
- Viral infections, allergens, tobacco smoke, exercise and stress can trigger or worsen asthma symptoms
- Exacerbations can be fatal and are more common in uncontrolled patients
- Treatment should be customized to the individual patients

(Global Initiative for Asthma (GINA), 2018)

Goals and Objectives

1. Improve asthma and COPD disease state knowledge
2. Improve knowledge of inhaler technique
3. Improve knowledge and skills to teach and assess inhaler technique to patients



CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

- Fourth leading cause of death worldwide
- Approximately 3 million people died in 2012
- Irreversible and disabling disease characterized by airflow limitation and persistent respiratory symptoms with airway and/or alveolar abnormalities, typically caused by exposure to noxious particles or gases
- Symptoms: chronic cough, dyspnea, sputum production
- Leading risk factor for disease is tobacco smoking

(Global Initiative for Chronic Respiratory Lung Disease (GOLD), 2018)

Background

- Asthma and COPD impose a significant burden on the patient, family and healthcare system (1)(2)(3)
- The diseases are not curable, but managed with inhaled therapy devices that deliver medications directly to the lungs (4)(5)(6)(7)(8)
- Inhaled medications decrease symptoms and exacerbations, improve quality of life and lung function (9)(10)(11)(12)
- Despite the availability of many inhaled devices, poor technique is common and has a significant effect on therapeutic benefit (13)(14)(15)(16)




Respiratory Inhalers At a Glance

Background Continued

- Up to 100% of patients demonstrate one or more errors, 92% demonstrate critical errors impacting drug delivery (Pavia et al., 2014)
- An estimated 25-65% of outpatients and 62-85% of inpatients do not use inhalers correctly (Pavia et al., 2014)
- Inhaler misuse accounts for \$5-7 billion of the approximate \$25 billion spent on inhalers annually (Pavia et al., 2014; Pavia et al., 2014)
- Inhaler misuse places patients at risk for worsening disease control and hospitalizations (Pavia et al., 2014)
- <http://www.ama-assn.org/speicalty/2014/04/01/ama-assn-issues-asthma-education>



Why Inhaled Medications Are Important

- Reduce symptoms
- Reduce frequency and severity of exacerbations
- Improve health status
- Improve exercise tolerance

(GOLD, 2014)

Poor Inhaler Technique



- Poor technique is correlated to patients' lack of understanding how to use a device and can result in reluctance to use a device (Pavia et al., 2014)
- Patients are often unaware they are using devices incorrectly or overestimate ability to use a device (Kuper et al., 2014)
- Patients are not properly matched to devices (Pavia et al., 2014)
- Patients are not properly trained and assessed by HCPs (Pavia et al., 2014)

Healthcare Professionals and Inhalers

- Current guidelines recommend inhaler technique be taught at time of initial prescription and assessed on a regular basis (GOLD, 2014)
- HCPs play a key role in teaching proper technique to patients (Pavia et al., 2014)
- Many HCPs do not have the skills or have not been educated on proper technique of different devices (Pavia et al., 2014)
- Direct correlation between improper HCP teaching and poor patient inhaler technique (Pavia et al., 2014)
- 39-67% of HCPs do not train patients and neglect to check inhaler use at subsequent visits (Pavia et al., 2014)

Common Errors With Inhalers

(GOLD, 2014)

- Inspiratory flow
- Inhalation duration
- Coordination
- Dose preparation
- Exhalation maneuver prior to inhalation
- Breath holding following inhalation

How Can HCPs Help Improve Inhaler Technique In Patients???

- HCP inhaler education
- Select and determine if a device is appropriate for each individual patient
- Provide initial teaching
- Use the teach-back method to assess and reassess the patient's ability to properly use an inhaled device

Matching Inhalers To Patients

- Individualized for every patient
- Use the shared care approach
- Evaluate patient goals, preferences, and attitudes toward device
- Ability to physically use device
- Assess at time of initial prescription
- Determine if device continues to be appropriate at subsequent visits
- Notify prescribing provider if patient's device is not appropriate

(Pavia et al., 2014)



Teach-Back Method

Fact: 40-60% of patients forget medical information told to them during an office visit almost immediately, and nearly half of the information that is retained is incorrect.



- "Show me"
- Allows HCPs to ensure they explained information clearly
- Ask patients to explain in their own words, or perform independently what they need to know or do
- Check patient's understanding of taught information, and if needed allows HCP to explain or teach again, and recheck
- Promotes adherence, quality and patient safety

<http://www.ama-assn.org/speicalty/2014/04/01/ama-assn-issues-asthma-education>

(Copyright by Healthcare Research Society (HRS) 2014)

Interactive Exercise

- Use the teach-back method to show your partner how to use the placebo inhaler device



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Appendix E

Surveys

Pre-Intervention Survey

1. Have you ever been given formal education on teaching proper inhaler technique?
 - a. If so, how long ago?
2. Do you review inhaler technique with patients at each visit?
 - a. If not, how often?
3. What are some common mistakes you see with patients using inhalers?
4. How do you currently teach and assess inhaler technique to patients?
5. How confident are you teaching and assessing inhaler technique to patients?
6. How often do you utilize the teach-back method when teaching inhaler technique?
7. How would you rate your ability to teach and assess inhaler technique?
8. What questions do you have on inhaler technique?

Immediate Post- Intervention Survey

1. How much did you learn in this presentation?
2. What is the most valuable piece of information you found?
3. Are you more likely to spend time with patients teaching and assessing inhaler technique at each visit?
4. How do you plan to utilize the information you learned into your routine plan of care for patients?

Four-Week Post-Intervention Survey

1. How confident are you teaching and assessing inhaler technique to patients?
2. How often do you utilize the teach-back method when teaching inhaler technique?
3. How would you rate your ability to teach and assess inhaler technique?
4. How have these learnings changed the way you teach and assess inhaler technique?

Appendix F

Titles of Leave Behind Reference Materials for Implementation Site

- Inhaler Device Selection and Technique Video
- Inhaler Technique for People with Asthma or COPD
- Respiratory Inhalers at a Glance
- Using Your Metered Dose Inhaler (MDI)
- Choosing an Appropriate Inhaler Device for the Treatment of Adults With Asthma or COPD
- Use the Teach-Back Method
- 10 Elements of Competence for Using Teach-Back Effectively
- The SHARE Approach: Using the Teach-Back Technique: A Reference Guide for Health Care Providers

Appendix G

Human Subjects Research Determination

UMassAmherst

Human Research Protection Office

Mass Venture Center
100 Venture Way, Suite 116
Hadley, MA 01035
Telephone: 413-545-3428**Memorandum – Not Human Subjects Research Determination****Date:** August 2, 2019**To:** Caitlin Crowley, Nursing**Project Title:** Improving Inhaler Technique in Asthma and COPD Patients: An Evidence Based Quality Improvement Project**IRB Determination Number:** 19-120

The Human Research Protection Office (HRPO) has evaluated the above named project and has made the following determination based on the information provided to our office:

- The proposed project does not involve research that obtains information about living individuals [45 CFR 46.102(f)].
- The proposed project does not involve intervention or interaction with individuals OR does not use identifiable private information [45 CFR 46.102(f)(1),(2)].
- The proposed project does not meet the definition of human subject research under federal regulations [45 CFR 46.102(d)].

Submission of an Application to UMass Amherst IRB is not required.

Note: This determination applies only to the activities described in the submission. If there are changes to the activities described in this submission, please submit a new determination form to the HRPO prior to initiating any changes.

A project determined as "Not Human Subjects Research," must still be conducted in accordance with the ethical principles outlined in the Belmont Report: respect for persons, beneficence, and justice. Researchers must also comply with all applicable federal, state and local regulations as well as UMass Amherst Policies and procedures which may include obtaining approval of your activities from other institutions or entities.

Please do not hesitate to call us at 413-545-3428 or email humansubjects@ora.umass.edu if you have any questions.



Iris L. Jenkins, Assistant Director
Human Research Protection Office