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# Inhaled Insulin, Afrezza, Educational Module for Health Care Providers

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This is to certify that the doctoral study by

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Abstract

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BSN, University of Phoenix, 2004

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Project Submitted in Partial Fulfillment

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## Abstract

Diabetes is on a global rise and there is a definite gap in providing care for the diabetic population. Two of the largest contributors to this gap in care are the lack of collaboration between health care professionals and the lack of education for health care providers on the evolution of diabetes treatment plans. This educational module is aimed to improve the management of care, and quality of life for patients living with diabetes, by providing education to health care providers on an alternative way to administer insulin therapy. The describing, analyzing, theorizing, and act, (DATA) model, and the theory of organizational change, were utilized in the development of this educational module. The key project question addressed the following: When health care providers are educated on the guidelines and effectiveness of the inhaled insulin, Afrezza, this educational module would improve professional knowledge when managing the care of patients living with diabetes. Quantitative and qualitative information were gathered by review of peer-reviewed articles and published, evidence-based practice guidelines. The pre-and posttest for the educational program outcomes and quality improvement measures were influenced by the Kirkpatrick evaluation model. This educational module was used to promote knowledge in the health care profession by providing education to twenty health care providers and stakeholders on the guidelines for the use, benefits, and effectiveness of using the inhaled insulin, Afrezza. The outcomes of this project resulted in an overall gain of 137.3% of knowledge on the use of inhaled insulin, Afrezza. The Food and Drug Administration has approved Afrezza, and with its use can promote positive social change, by reducing the number of daily injections, improve the quality of life for patients living with Diabetes, and reduce environmental biohazard materials globally.

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# Dedication

This is dedicated to the lifelong commitment and sacrifice for all of the population that is living with diabetes and to all of the health care providers that are devoting their time and effort in helping improve the quality of life for others.

Acknowledgments

I would like to start by thanking both of my brilliant, loving sons, Wesley Chase, and Hunter Drew, for the countless hours that they have dedicated to my professional success, educational endeavors, and always being my biggest fans, you both have been with me through it all and literally all over the world and back. I wouldn't be the person I am today without you both. I love you more. Thank you for giving me the extra love and support by incorporating your beautiful spouses in my life, Chelsea and Maggie, I appreciate you both so very much. I most certainly want to give extra thanks for my beautiful granddaughter, Sawyer Layne, your smile lights the world, and you are most definitely my sunshine, squiggly, diggly do, I love you.

Next, I would like to thank my husband for the dedication, and support that you have given me over the past 4 years that we have been together in completing my educational goals, I appreciate you more than words can ever express. I love you.

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Islands, and it would be impossible to list everyone's names, but you know who you are, I love and appreciate you all.

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# Section 1: Nature of the Project

## Introduction

Diabetes is a group of chronic disease that is defined by hyperglycemia because of abnormal metabolism of carbohydrates and glucose due to the body's inability to respond to or produce the hormone insulin.(American Diabetes Association,2020). Diabetes does not discriminate against age, race, or gender. The number of patients living with diabetes is increasing and there are two significant contributing factors that are related to poor health care management of this patient population: the lack of collaboration between health care professionals and the lack of education for health care providers on the evolution of diabetes treatment plans.( Centers for Disease Control and Prevention,2021).

One of the most significantly used drugs within the treatment regimens of Type 1 and Type 2 diabetes is insulin. Many people living with diabetes receives five or more injections of insulin daily to keep their glucose levels controlled.( Edelman & Pettus, 2020). Injectable insulin has been on the market since its introduction in 1921 by Banting and Best from the University of Toronto.( Vecchio et al., 2018). Although another option to administering Insulin has been introduced almost a century ago by German researchers, it has been greatly down played and overlooked in the health care industry. This other method of insulin administration, by the route of inhalation and called Afrezza, is now approved by the Food and Drug Administration (FDA) and would reduce the number of daily injections for patients living with diabetes.

The ultimate goal in the development of this educational module project was to improve, support, and educate the global population on the benefits of using the inhaled insulin, Afrezza, by means of educating health care providers first. Identifying gaps within health care providers knowledge on the utilization of the inhaled insulin, Afrezza, and developing an educational module for the improvement of their knowledge base, could promote positive change when managing diabetes. This educational module could promote collaboration between health care providers, improve the quality of life for patients living with diabetes, and improve clinical outcomes. I designed this educational module to inform health care providers of the possibility to take a part in two major global focus points when managing diabetes: (a) the use of the inhaled insulin, Afrezza, could decrease global biohazardous waste, such as insulin syringes. and (b) the use of the inhaled insulin, Afrezza, could decrease the global expenditure on diabetes management and the multiple comorbidities that couple with having diabetes.

## Problem Statement

Diabetes is on a global rise, and there is a definite gap in providing care for the population of people living with diabetes.( Cleveland Clinic, 2021). One of the largest gaps in providing care for patients living with diabetes is ensuring that health care providers stay apprised on the ever-evolving diabetic treatment plans and medication regiments. Another identified gap is individualizing diabetes plans of care according to a patient's needs to assure adherence to prescribed treatment regimens. Living with diabetes, and trying to accomplish controlled glucose levels is a life-long commitment

that takes dedication and work, not only from the patients but the health care providers as well. At times a person living with diabetes can experience diabetic fatigue, loose hope, and fall back into the patterns of unhealthy behavioral lifestyles due to lack of clinical support, or not making the commitment to give themselves four or more insulin injections along with four or more blood glucose checks daily.

The American Diabetes Association (ADA, 2018) estimated that the total costs of diagnosed patients living with diabetes has risen to $327 billion in 2017 from $245 billion in 2012; this was a 26% increase over a 5-year period. According to the ADA the total expenditure of $327 billion, when broken down into various categories would be as follows: $237 billion is in direct medical costs, and $90 billion was in reduced productivity, meaning 30% is inpatient hospital care, 30% prescription medications from complications of diabetes, 15% antidiabetic agents and supplies and 13% for health care provider visits. For their diabetes management alone, a projected yearly medical expense for each individual patient living with diabetes is at least $16,752. (GlobeNewswire,2020).

Identifying gaps within health care providers knowledge base and providing education on the use of the inhaled insulin, Afrezza, can promote an alternative method to managing glucose levels. The utilization of this alternative method for the management for diabetes could improve the quality of life, promote medication adherence, and ameliorate health outcomes for patients living with diabetes. The adherence to individualized care plans for patients living with diabetes could help with the reduction of rehospitalizations due to the multiple comorbidities that are attributed to diabetes. The

reduction of rehospitalizations due to improved medical adherence would, in turn, help with the reduction of the overall global health care expenditure due to diabetes management.

## Purpose Statement

There are two major contributors to the gap in providing health care for diabetes management: the lack of collaboration between health care professionals and the lack of education for health care providers on the most current practice guidelines for individualized treatment plans for patients living with diabetes. It is almost impossible for a health care provider to stay apprised on the ever-evolving diabetic treatment plans and the preferred medication regiments that are on the pharmaceutical market. There are many different medication regiments for the treatment of diabetes, creating an overwhelming information for health care providers to make decisions with when treating patients living with diabetes.

The guiding practice-focused questions for this project were:

1. If health care providers are educated on the guidelines for the use, administration, and effectiveness of using the inhaled insulin, Afrezza, will they be more likely to utilize this medication regimen?
2. Will the development of this educational module improve collaborative measures within the health care professional's practice for both growth and improvement when managing the care of patients living with diabetes?

Over centuries, there have been many different treatments and practice guidelines that have emerged for diabetes management. However, one of the primary health goals of Centers for Disease Control and Prevention, (CDC) and Healthy people 2030 has not changed in the last 10 years. The goal of reducing the burden of diabetes and improving the quality of life for the population of people living with diabetes still plays a vital part in health care (Office of Disease Prevention and Health Promotion, 2021).

There have been many studies and documented testimonials that show that the combination of the use of the inhaled insulin, Afrezza, and continuous glucose monitors (CGMs) is proven to be beneficial. (Afrezza.2021; Edelman & Pettus, 2020; MannKind Corporation,2020; Pettus, 2021). The advantages reported were reducing three or more daily insulin injections and decreasing patients sticking their fingers at least four or more times daily in order to adjust insulin dosages in correlation to their glucose levels. This is a total reduction of 210 or more sticks and injections monthly, and 2,520 or more sticks and injections yearly. (MannKind Corporation, 2020). An Inhaled insulin treatment regimen for Type 1 and Type 2 diabetes mellitus is literally changing patients' lives and allowing them to control their glucose levels in a healthier, safer and more manageable fashion. Another benefit of the use of inhaled insulin is the overall expenditure in diabetes management costs will be reduced along with the reduction of biohazard materials, such as used hypodermic needles and syringes.

## Nature of the Doctoral Project

To provide quality, effective patient care, it is necessary for health care providers to recognize when they are deficient or lacking in education in specific areas of their

training and seek continuing education for these deficiencies. I used two different guides to create the outline for this educational project: Bloom's Taxonomy, The American Association of Colleges of Nursing's (AANC) *The Essentials of Doctoral Education for Advanced Nursing Practice.*

During the formation of this educational module, I used a well-developed framework for effective development and evaluation for advancement in knowledge to focus on key components. Both quantitative and qualitative information centered on evidence-based research were retrieved and reviewed. The research content for this project contains current practice guidelines and statistical facts with the intent to promote quality patient care as well as improving patients' quality of life and clinical practices.

I combined a model and a theory as the conceptual framework for this project. The DATA model was used to help develop this educational module for improvement of health care management of diabetes and endocrinology patients. The theory of organizational change was also used to develop this particular program for improving diabetes management.

During the evaluation I intended to analyze outcomes; however, evaluation was an ongoing activity that actually started at the beginning of the formulation of the research plan and that continued even after the interventions were completed. With this program, a pre and posttest was given to the participating health care providers to evaluate their knowledge level on five specific areas of focus with the management of diabetes: diabetes treatment regimens; diabetes drug class updates; the guidelines for

treating with the inhaled insulin, Afrezza; and the health care provider's collaborative practice habits when managing diabetes.

The use of the pre- and posttest in this project was influenced by the Kirkpatrick evaluation model. Several researchers have noted that Kirkpatrick's approach has been popular as a model for evaluating learner outcomes in various training programs.(Kurt, 2018). This model has contributed to educational evaluation with focus on program outcomes through the evaluation of how well the content was absorbed. There are four different stages of evaluation: formative, process, impact and outcome.( Kurt, 2018). Each stage begins at different times in a research study process.

The aim for this education module was to help close the gap within health care practice when managing the care of patients living with diabetes by improving healthcare providers' knowledge base on the use of the inhaled insulin, Afrezza. Afrezza use has shown to be of benefit to some patients living with diabetes and many health care providers that manage the care patients with diabetes (Edelman & Pettus 2020). This education module can help improve collaborative practice, health outcomes, eliminate rehospitalizations due to the multiple comorbidities that are attributed to diabetes, and reduce overall global health care expenditure due to diabetes management. It is necessary for health care providers to collaborate with other health care professionals and to stay apprised to the ever evolving diabetes treatment plans and medication regiments.

## Significance

When planning an educational program, it is important to outline program goals and objectives to address the targeted population and stakeholders. This program enhanced health care providers' knowledge by developing an educational module on the use of the inhaled insulin, Afrezza. This educational module could improve and promote individualized patient care plans. I developed this program to promote collaboration with subsequent health care providers or specialist to improve continuity and quality of care for patients that are living with diabetes.

When trying to form an educational program for health care providers that manage care for diabetes, it is important to focus on who the stakeholders are. The stakeholders that were most prevalent in my ideation of this program were, first and foremost, the patients, to improve their overall health and lower medical costs. The second stakeholder was the various governmental agencies and insurance companies with incentives to cut medical spending for the management of diabetes due to decreased medications, supplies, and hospitalizations from other comorbidities in direct correlation with diabetes. The third stakeholder was the health care providers with an incentive of having improved knowledge base, patient outcomes and success with providing quality care. One of the most important stakeholders would be the global population of people living with diabetes, with the incentive to improve quality of life, decrease the number of injections taken daily, and have improved health outcomes.

At an organizational level, proper evidence has to be provided showing that an educational program is needed, which can be accomplished by collecting data,

identifying and educating stakeholders with this supported data. Recent estimates showed the global prevalence of diabetes to be 382 million people in 2013, and this number is expected to increase to 592 million by 2035. (Gandhi & Wareham, 2016) There are endless amounts of data that has already been collected by multiple organizations, including the ADA, American Nurses Association, Association of Diabetes Care and Education Specialist, etc. that support the fact that Type 2 diabetes is preventable and yet it continues to occur due to unhealthy lifestyles. (Office of Disease Prevention and Health Promotion, 2021). Many changes in health care and the development of integrated delivery systems have expanded healthcare providers' efforts to acquire new information about more efficient approaches that enhance discipline-specific and interdisciplinary contributions to improved patient outcomes. Both Type 1 and Type 2 diabetes can lead to multiple systemic complications. Involving microvascular problems, such as retinopathy, neuropathy, and nephropathy along with macrovascular problems such as cardiovascular disease, stroke, peripheral vascular disease, and kidney disease (ADA, 2018) .

I developed this educational module with the following goals related to providing positive social change:

- Helping health care providers stay apprised of and educated on the evolution of an alternative method of administering insulin.
- Improving the quality of life for the population living with diabetes.
- Reducing health care costs.
- Reducing biohazardous materials to promote eco-friendly measures.

## Summary

The educational program developed for this project provides information on the guidelines for use, administration, references, benefits, and effectiveness of using the inhaled insulin, Afrezza. This program supports collaborative measures between health care professionals when managing diabetes.

This educational program was one method of taking steps to help improve care for the population of people living with diabetes as well as health care providers' knowledge and practice utilizing evidence-based information. According to Kettner et, al., (2017), " In effectiveness-based program planning, one should be able to make explicit two things about a program: 1. The results that are to be achieved and 2. The manner in which these results will be achieved" (p. 11).

Creating a pre- and posttest that identified gaps in healthcare providers' knowledge base on the management of diabetes could make a positive impact in identifying areas of need in their educational process. It is necessary for health care providers to recognize when they are deficient or lacking in education in specific areas of their training and seek continuing education for these deficiencies to avoid providing poor patient care and medical errors. Health care providers want to provide quality, efficient care and help their patient population with their health issues. Health care providers have an obligation to the patients to be proactive and help form strategic plans and policies that help improve patient populations' overall health outcomes. The term

*beneficence* is defined as the obligation of a health care provider to help people that are in need (Bodenheimer & Grumbach, 2016).

Injectable insulin has been highly utilized since the 1920's for glycemic control for patients living with diabetes; however, there is now an FDA- approved alternative method for the administration of insulin that can promote an improved quality of life for this patient population. The development of this educational program could be beneficial for healthcare providers, patients, governmental funding agencies, insurance companies, and the global population.

## Section 2: Background and Context

Diabetes is on a global rise and there is a definite gap in providing care for the diabetic population. One of the largest gaps in providing care for patients living with diabetes is ensuring that health care providers stay apprised on the ever evolving diabetic treatment plans and medication regiments. Another identified gap is individualizing diabetes plans of care according to a patient's needs to assure adherence to prescribed treatment regimens.

The guiding practice-focused question for this project were:

1. If health care providers are educated on the guidelines for the use, administration, and effectiveness of the inhaled insulin, Afrezza, will they be more likely to utilize this medication regimen for improvement in the quality of life for patients living with diabetes?
2. Will the development of this educational module improve collaborative measures within the health care professional's practice for the growth and improve the management of care for patients living with diabetes?

The aim for this module was to help close the gap within healthcare practice when managing the care of patients living with diabetes. Identifying gaps within healthcare providers' knowledge base and providing them with education on the use of the inhaled insulin, Afrezza, could promote an alternative method to managing glucose levels. This alternative method of insulin delivery, by route of inhalation, could improve the quality of life, medication adherence, and health outcomes for patients living with diabetes.

Improved adherence to individualized care plans for patients living with diabetes could help in eliminating rehospitalizations due to the multiple comorbidities that are attributed to diabetes and reducing the overall global health care expenditure due to diabetes management. The Ultimate goal in the development of this educational program was to improve, support and educate the global population on the benefits of using the inhaled insulin, Afrezza, by means of educating healthcare providers first.

In this section, I discuss the following major areas of focus for this project:

1. The concepts, models and theories that are related to the development of this project.
2. How this project will be relevant to nursing practice.
3. The local background and context for this project.
4. What my role as the Doctor of Nursing Practice (DNP) student was throughout the development of this project.
5. A summarization of section 2 of this project.

## Concepts, Models, and Theories

One of the key strategies for program planning is identifying a problem and its etiology. (Kettner, et, al., 2017*).* Another key factor to focus on when analyzing for program planning is determining the characteristics of a population. A program design is identifying and conspiring the elements that make up the delivery of service. It is important that the program planner is very specific within explaining the needs and how

the program will service those problems by defining the expected results. (Kettner et, al., 2017*).*

Designing a program for improvement within health care involves problem solving, so it is important to choose a model that is based around the theory that will help establish necessary steps to achieve desired outcomes. The model that seems most appropriate for the improvement of health care management of diabetic and endocrinology patients was the DATA model. The theory of organizational change aligned closest with this particular program for improving diabetic management.

The DATA model focuses on reflective practice, which is one of the six essential competencies. (Smith, et al., 2016). The letters in the DATA model refer to: D is for describing what is has been happening within practice; A is for analyzing, and evaluating what is currently happening in practice and answering the question of why is it happening; T is for focusing on theorizing the practice, which follows sequence after the analyzing step; and the second A is for act, which is for laying out and action plan to change practice through theory. In 1933 educational philosopher, John Dewey, influenced the formation of the DATA model by defining the meaning of reflection, which later led to the work of Donald Schon in 1983 in the book, *The reflective practitioner: How Professionals Think in Action*, and J.M. Peters in 1991 in the book *Strategies for Reflective Practice*.

The theory of organization change focuses on the concepts of identifying and defining the problem, action initiation, implementation of change, and promoting institutional change (Smith et al., 2016). The theory of organization change provides

many different organizations with ways to expand and allow innovation through new technologies and program design as well as promote obtaining new goals. This theory and model both recognize that organizations evolve through a series of stages, and moving from one stage to the next requires different sets of plans and aligned activities.

The evaluation of a program is essential in determining the areas of success and how improvement measures are needed in order to improve outcomes. It is vital to evaluate the impact of the program. Kettner et al. (2017) stated that " An impact program evaluation seeks to establish a cause-and effect relationship between a program and its outcome results." ( p 205). Kettner et al. emphasized that the primary purpose of program evaluation is to provide feedback on results, accomplishments, or impacts; inform the planners, policymakers and stakeholders about program effectiveness; and determine if the correct social interventions, and hypotheses are being conducted.

The evaluation model most appropriate for this project was the Kirkpatrick evaluation model. Dr. Kirkpatrick was a Professor at the University of Wisconsin and an honorary chairman of Kirkpatrick Partners until passing away in 2014. Dr. Kirkpatrick created the Kirkpatrick model in 1950 to evaluate a human relations training program for supervisors, it has been the most widely recognized evaluation model globally for training programs(Kurt,2018). The model has a four-level concept of program/training evaluation: reaction, learning, behavior, and results.

I utilized the Gantt chart to help communicate the detail involved in achieving the project goals of this educational module. It allowed a demonstration of a constructed time line of project progression throughout the entire project. The Gantt chart was useful for the organization and tracking of this program goals in a timely manner and was a valuable piece within the organizational arrangement of this project. (see White et al., 2021).

## Relevance to Nursing Practice

The global diabetes prevalence in 2019 was estimated to be 9.3% (463 million people), and it is expected to accelerate to 10.2% (578 million) by 2030 and continue to climb to 10.9% (700 million by 2045. (Saeedi et al., 2019). Both Type 1 and Type 2 Diabetes can lead to multiple systemic complications involving both microvascular and macrovascular problems (ADA, 2018). Microvascular complications affect things, such as retinopathy, neuropathy, and nephropathy, while macrovascular problems can occur, such as cardiovascular disease, stroke, peripheral vascular disease, and kidney disease. It is important to understand the reciprocal relationship between diabetes and vascular disease due to the multiple comorbidities that concomitantly occur (ADA, 2018).

Type 2 Diabetes has been identified with being in direct correlation with poor eating habits, obesity, unhealthy lifestyles, medication regimen adherence, and lack of proper education (ADA, 2020). Many lifestyles can be a contributing factors to the development of Type 2 diabetes; however, two of the most profound joint associations is obesity, and medical non-compliance ( ADA, 2020). Obesity can be a genetic factor or

can be developed due to unfavorable lifestyles. There is a close relationship between type 2 diabetes (T2D) and obesity due to the significance of obesity in the development of metabolic disorders. There is a direct relationship of free fatty acids in the blood and visceral fat with insulin resistance. (Sheikhpour et al., 2020). Even though T2D was once called “Adult onset Diabetes”, this classification has pretty much been eradicated from use in the health professional terminology due to the rapid increase in prevalence of T2D in children and adolescents due to childhood obesity.

Two identified health care gaps when providing care for the population of patients living with diabetes were at the center of this project. One of the identified issues was ensuring that health care providers are educated on the most up-to-date guidelines, and treatment regimens available for treating diabetes. The second issue was the lack of collaboration within health care providers when managing care for diabetes. Being a health care provider that is caring for patients living with diabetes can be challenging at times due to patients getting diabetic fatigue and lack of medication adherence. Non-adherence is often attributed to insulin administration and blood glucose checks (Edelman & Pettus 2020). The endless amount of insulin injections, along with the multiple finger sticks is a detouring factor with patient compliance.

Injectable insulin has been widely utilized for the treatment of both Type 1 and Type 2 diabetes mellitus since 1921 (Vecchio et al., 2018). Since 2014 there has been a FDA- approved alternative route for insulin administration by route of inhalation; however, it is not used in abundance due to the lack of knowledge by many healthcare providers (Edelman & Pettus 2020).

The idea of inhaled insulin has been a concept for almost a century without apt recognition. One research article, by Gillis (2006) reported that German researchers had introduced the idea of inhalable insulin in 1924. There have been many years of trials on finding ways to properly administer inhaled insulin, and success was accomplished when scientists realized that with the utilization of technology, insulin could be turned into a powder that had particles correctly sized for inhalation. Over many years of investment and research with several failed attempts from multiple drug companies, in June of 2014, the FDA approved the use of Afrezza inhaled insulin for both Type 1 and Type 2 adult diabetics. According to results presented at the 2018 meeting of the ADA, Afrezza increases the time that blood glucose levels remain in optimal range (70-180 mg/dl), reducing both spikes in blood glucose and time in hypoglycemia in adults with Type 1 diabetes compared to other rapid acting insulins (Snell-Bergeon et al., 2018). Despite the fact that an FDA- approved, rapid acting, inhaled insulin has been commercially available for diabetic patients since 2014, a large population of healthcare providers are unaware of its existence, indications for use, management guidelines, dosing, and prescribing methods. With the combined use of CGM's and Inhaled insulin as an alternative to multiple insulin injections and numerous finger sticks before insulin administration, patients have increased compliance to medication regimens, decreased A1C levels and daily average glucose levels (Edelman & Pettus,2021).

One of the goal for the development of this evidence-based practice educational program on the use of the inhaled insulin, Afrezza, was to help keep health care providers

apprised and educated on the evolution of new and improved ways to treat patients living with diabetes. Some of the other goals that are focused on are:

- For health care providers to recognize deficiencies in their knowledge base for diabetes management.
- Improve the overall quality of care for patients living with diabetes.
- Improve clinical practice for health care providers when caring for patients living with diabetes.

## Local Background and Context

For the success of a human service program, it is important to focus on the actual lives that the program will be affecting and helping. Understanding the limitations and barriers of a specific population and adjusting to their culture is a large step towards health care improvement and the success of saving lives (White et al., 2020).

The two groups that will provide the most accurate feedback from the program implementation for the improvement of diabetes management by enhancing health care providers' knowledge on the use of inhaled insulin would be the population living with diabetes and Healthcare providers. More often than not, patients want to improve their health and want to cease disease processes; however, some patients do not have access to proper health care, are not educated properly, or cannot afford proper medications for the most effective treatment for their diabetes. Health care providers could benefit from this educational module by having improved patient outcomes and quality of life for their patients as well as success with providing quality care. Health care teams are vital in

helping people that are living with diabetes manage their disease and have a quality life (CDC, 2021). It is imperative that health care providers stay apprised on the evolution of modern technologies and medication regiments for patients, including diabetic management. The interrelationship was applied in refining my evidence-based practice project by utilizing my knowledge base from previous experiences and the understanding of theory based interventions.

## Role of the DNP Student

The DNP student has many roles and expectations beyond just advancing in levels of education in the hierarchy of the profession. One of these roles has to do with scholarship, " Defining Scholarship: Nursing scholarship is the generation, synthesis, translation, application, and dissemination of knowledge that aims to improve health and transform health care" (AACN, 2018, p.2). This definition is essential in the application for any level of education within the nursing profession.

The Institute of Medicine (2010), lead a study with an interdisciplinary committee outlining four recommendations for effective practice within the nursing profession:

1. Should practice to the full extent of their education and training.
2. Should achieve higher levels of education and training through an improved education system that promotes seamless academic progression
3. Be full partners, with physicians and other healthcare professionals, in redesigning health care in the United States.

4. Engage in effective workforce planning and playmaking that requires better data collection and an improved information infrastructure (p. 1).

As the recommendations were transitioned to action and policy, the need to expand access through doctoral education for nurses was imperative. (The National Academies of Sciences Engineering Medicine. 2021).

It is necessary for health care providers to recognize when they are deficient or lacking in education in specific areas of their training and seek continuing education for these deficiencies, in order to provide quality, effective patient care. I have utilized three different guides in order to create the outline for my doctoral project. The three guides are Bloom's Taxonomy, The American Association of Colleges of Nursing's, The Essentials of Doctoral Education for Advanced Nursing Practice.

Bloom's Taxonomy was created in 1956 by Benjamin Bloom and collaborators, Englehart, Furst, Hill and Krathwohl in order to provide framework for educational goals. Over the decades the original Taxonomy of 1956 has been revised by many different authors including psychologist, curriculum theorists and researchers.

The definition of advanced nursing practice according to the AACN, (2020).

> *Any form of nursing intervention that influences health care outcomes for individuals or Populations, include the direct care of individual patients, management of care for individuals and populations, administration of nursing and health care organizations and the development and implementation of health policy.*

Within the DNP curriculum the AACN identifies two components; they are the eight DNP Essentials for competencies for all DNP program graduates, and specialty competencies for the DNP graduates that practice in particular specialties. The DNP prepared nurse has many different roles and expectations that clearly evolve and grow even after the program is completed.

With the ever evolving changes within care regimens and practice guidelines, it is important to focus and adhere to the most up-to date evidence-based practice standards of care, and to stay apprised and educated on new developments. It is important for the DNP graduate understand how to utilize evidence-based practice, by being prepared to perform critical appraisal of literature, apply practice guidelines, design and implement evaluation practice outcomes (Terry, 2018).

The practicum setting that I conducted this research study from was an endocrinology clinic that belongs to a corporation in which is rapidly growing and expanding many clinics within the United States and other countries. This clinic utilizes many different evidence-based models in order to provide the most up-to-date and quality care for initializing individualized patient care regiments for treating diabetes. When reflecting on the emphasis that this endocrinology clinic places on evidence-based research and current practice guidelines, it is evident that their goals for patient outcomes and clinical improvement are the driving force of their mission. This clinic strives for improvement not only for the population living with diabetes, but within health care in general. Another emphasized goal for this clinic is staying apprised and educated on the evolution of new and improved ways to treat patients. This organization does utilize

Afrezza and that is how I became interested in learning more of this new method of administering insulin. As my knowledge grew on this topic, the more apparent it became that not many healthcare providers are knowledgeable in regards to the inhaled insulin, Afrezza. I have witnessed many times with in practice, the utilization of this rapid-acting inhalable insulin, Afrezza change patient's living with diabetes perception on their disease process. This is a profound accomplishment in health science, there are many patients that are suffering through five or more insulin injections a day, along with five or more finger sticks a day in order to control their glucose levels. I found it necessary to share these successful outcomes with my colleagues, other health care professionals and my patient population for the improvement in quality of life for patients living with diabetes.

## Summary

In summary of section 2, a review of the concepts, models and theories utilized in detail to give a better understanding of the methodology used during program planning, designing, outlining research, implementing strategies and evaluation methods.

With the use of a pre-and posttest, evaluation was conducted throughout the entire project of creating an educational program for the use of the inhaled insulin, Afrezza. This program could help address the community gaps in health care for the population of patients that are living with diabetes. By providing education on the inhaled insulin, Afrezza, for health care providers that manage the care of patients living with diabetes, will allow them an opportunity to offer an alternative medication regiment to their

patients. This could improve their patient's quality of life and improve their health outcomes.

## Section 3: Collection and Analysis of Evidence

Diabetes is on a global rise and there is a definite gap in providing care for the diabetic population. One of the largest gaps in providing care for patients living with diabetes is ensuring that health care providers stay apprised on the ever- evolving diabetic treatment plans and medication regiments. Another identified gap is individualizing diabetes plans of care according to a patient's needs to assure adherence to prescribed treatment.

The aim for this education program was to help close the gap within healthcare practice when managing the care of patients living with diabetes. Identifying gaps within health care providers knowledge base and providing them with education on the use of the inhaled insulin, Afrezza, could promote an alternative method to managing glucose levels that will improve patients' quality of life and medication adherence. The adherence to individualized care plans for patients living with diabetes could help in eliminating rehospitalizations due to the multiple co-morbidities that are attributed to diabetes, and reduce overall global health care expenditure due to diabetes management. The ultimate goal of this educational module was to improve, support, and educate the global population on the benefits of using the inhaled insulin, Afrezza, by means of educating healthcare providers first.

Health care providers and the patient population living with diabetes could benefit from this education module on the use of inhaled insulin. Health care providers could

offer patients that have diabetes an alternative method of delivering insulin, possibly resulting in improved patient outcomes and quality of life as well as the increased provision of quality care. This educational module could also help health care providers to stay updated on the evolution of modern technologies and medication regiments for patients living with diabetes.

In this section I discuss the following four areas of focus for this project:

1. Clarifying the practice-focused questions and how they both align with this doctoral project.
2. Clearly identifying the sources of evidence that were used, and how they were obtained for the development of this project, including any participants and their ethical protection.
3. Describing the systems used for analysis and synthesis in this project to address the practice-focused question.
4. Summarizing of Section.

## Practice-Focused Question(s)

There are two major contributors to the gap in providing health care for diabetes management: the lack of collaboration between health care professionals and the lack of education for health care providers on the most current practice guidelines for individualized treatment plans for patients living with diabetes. It is almost impossible for a health care provider to stay apprised on the ever- evolving diabetic treatment plans and the preferred medication regiments that are on the pharmaceutical market.

The guiding practice-focused questions for this project is:

1. If health care providers are educated on the guidelines for the use, administration, and effectiveness of using the inhaled insulin, Afrezza, will they be more likely to utilize this medication regimen for improving the quality of life for patients living with diabetes?
2. Will the development of this educational module improve collaborative measures within the health care professional's practice for the growth and improvement of the management of care for patients living with diabetes?

Managing the care of patients living with diabetes can be difficult for health care providers due to the overwhelming number of medication treatment regiments available for glycemic control. The rapid evolution of diabetes medication research updates at times creates a barrier for healthcare providers in staying knowledgeable, and updated on the wide variety of medications for treatment of diabetes. The world diabetes drug market is valued at over 57 billion USD in 2018 and is estimated to reach 87 billion USD by the end of 2025 (GlobeNewswire, 2020). There are hundreds of different diabetic medications for Type 1 and Type 2 diabetes, including insulins and oral medications to help meet glycemic control.

Over many decades, many different treatments and practice guidelines have emerged for diabetes management. Injectable insulin has been utilized for over a century for the control of glycemic levels in both Type 1 and Type 2 diabetes mellitus. For many years, insulin injections have been the first choice as the treatment for diabetes due to unestablished guidelines for the treatment of diabetes and health car providers'

knowledge deficit of practice guidelines for managing diabetes. For almost a century, there has been the idea of an alternative way to administer insulin by means of inhalation, however through different trials and research programs there was little success in implementing this theory until 2014 when the FDA approved the inhaled insulin, Afrezza. This form of insulin has a rapid onset of approximately 10 minutes, its peak action is strong. and it is metabolized within 90 minutes to avoid hypoglycemic events, while other injectable insulins act too slow and metabolize much slower. (Edelman, 2020). Almost a decade has passed since the FDA approved Afrezza, and there is still a v limited amount of health care providers and patients knowledgeable not only of the existence of Afrezza, but the guidelines for its use, treatment, dosing, and maintenance.

Creating a pre- and posttest for this project helped to identify gaps in health care providers' knowledge base when managing diabetes. The creation of an educational module on prescribing, administering, evaluating for effectiveness, and monitoring of the inhaled insulin, Afrezza, along with the use of CGM's could make a positive impact in health care. Identifying areas of need in the nursing profession's educational process is necessary to recognize when nurses are deficient or lacking in educational development in specific areas of their training. This allows for the healthcare professional to seek continuing education for these deficiencies to avoid providing poor patient care and medical errors. With the utilization of this educational module on the inhaled insulin, Afrezza, healthcare providers could feel more knowledgeable and confident in offering a different method of insulin administration.

## Sources of Evidence

I retrieved multiple sources of evidence on medication and treatment regimens for managing diabetes for this project. Even though the inhaled insulin, Afrezza, has been around for years, health care providers and patients still have many questions regarding it. Recently, there have been an increasing amount of articles, studies, presentations, and books to share information on the utilization of Afrezza.

Some of my primary sources of reference for this study were the ADA, CDC, American Nurses Association, American Association of Diabetes Educators, and MannKind Corporation. I also used peer-reviewed articles, conferences, presentations based on evidence-based practice, pharmaceutical studies, and statistical outlines as sources.

These sources of evidence were aligned with the purpose of this project because they were based on evidence-based practice; current guidelines; statistics; and research conducted by various organizations, health care professionals, scientists, and human service programs. All these sources of evidence provided information to help in bridging the gaps when providing health care for diabetes.

One of the key strategies for program planning in this project was to identify the problem and its etiology. When designing a program for improvement within health care that involves problem solving, it is important to choose a model that is based around a theory that will help establish necessary steps to achieve desired outcomes (Kettner, 2017).

During the evaluation of this educational project, I intended to analyze outcomes; however, evaluation was an ongoing activity that actually started at the beginning of the formulation of this research plan and continued even after the interventions were completed. In this program, a pre-test was given to health care providers to evaluate their knowledge level of diabetes treatment regimens, drug class updates, and treatment guideline updates with a specific focus on the utilization of inhaled insulin. This test allowed for the identification and determination of problematic areas. This focus provided the opportunity to implement change within the educational process for strengthening providers' knowledge of evidence-based practice with the use of inhaled insulin.

Next, I constructed an educational module with the compiled information to provide education to providers on the guidelines for use, dosage titration, medication management, and administration of inhaled insulin. This module was designed for healthcare providers that are managing the care of Type 1 and Type 2 diabetes.

The final evaluation was conducted using the results of the post-test given to the health care providers after completing the review of the educational project module with virtual assistance through a Zoom conference. This helped evaluate if the healthcare provider gained a better understanding of and knowledge on the use of inhaled insulin, which was the ultimate goal for this project.

My utilization of the pre- and post-test was influenced by the Kirkpatrick evaluation model. Several researchers noted that Kirkpatrick's approach has been popular as a model for evaluating learner outcomes in various training programs (Kurt, 2018).

This model has contributed to educational evaluation with a focus on program outcomes through the evaluation of how well the content was absorbed. There are four different stages of evaluation: formative, process, impact, and outcome. Each stage begins at different times in a research study process.

Some of the search engines, databases and key search terms used to find outcomes and research related to the practice problem are:

- Use of Afrezza
- Gaps in healthcare when managing diabetes
- What are the standards of medical care in diabetes?
- How was inhaled insulin discovered?
- When was Afrezza approved by FDA?
- How did insulin get discovered?
- Do healthcare workers understand the use of Afrezza?
- Centers for Disease Control/Diabetes
- American Diabetes Association/Afrezza
- MannKind/Afrezza
- Improved outcomes when using Afrezza
- Theories and models for project formation
- Theories and models for learning project evaluation outcomes
- Understanding Kirkpatrick's evaluation model.

There are many different databases and search engines that can be used for the purposes of understanding the use of the inhaled insulin, Afrezza; defining gaps in

providing health care for diabetes; and improving health care for the disease process of diabetes. I completed comprehensive research for the purposes of this project and in full alignment with the defined problem and practice-focused questions.

In terms of years searched, the scope of this review began in the early 1900's. Inhaled insulin was initially thought of in the 1920's by German researchers (Vecchio, 2018). The FDA had approved one type of inhaled insulin in 2012 named Healio; however, it failed to be used due to its administration device (Vecchio, 2018). In 2014 the FDA approved, Afrezza, and it is now the only successfully FDA- approved inhaled insulin on the pharmaceutical market.

The participants in this project were 20 health care providers that manage the care of patients living with diabetes. They were randomly selected out of health care providers that I often collaborate with through my practice, some being primary care providers, emergency medicine providers, urgent care providers, endocrinology specialist, obstetrician-gynecologist providers, internal medicine providers, cardiologist providers, and certified diabetic educators. I emailed special instructions to each potential participant requesting their participation in this project study and providing them with specific information on the steps necessary to participate without interfering with the results or placing biased information within the outcomes of the study.

The techniques used to outline and evaluate the project for effectiveness was: The first phase was that the pre-test was physically mailed to each participant in an unmarked, non-numbered or trackable and ask that upon receipt and taking the pre-test that it be returned in the pre-addressed, stamped envelope, without placing any

identifying information on the test or envelope. After all of the pre-tests were received back through the U.S. mail, the second step was implemented. The second step was that a post-test, along with an educational module and an evaluation form, with a return, pre-addressed, stamped envelopes was sent via U.S. mail. The third phase was a scheduled virtual presentation was held with the participants one week after the post-test, evaluation form and educational module was mailed. The fourth phase was requesting that after the virtual presentation on the content of the educational module was completed, that the participants complete the post-test, and evaluation form in the return, pre-addressed, stamped envelopes that day.

The final phase was evaluating the pre and posttest along with the evaluation forms for feedback for improvement measures, effectiveness of the educational module, and presentation towards the practice focused questions and outcome goals. I protected the participants within this project by removing any identifiers such as names, date of birth, etc. There was no enrollment policies or obligations any further that the above listed protocols. There was no patient information, identifiers or discussion in regards to patient's names, date of birth, case numbers, or identifiers utilized within this project. There was no patient participation in this project.

The role of the Walden University Institutional Review Board (IRB) approval # 06-23-21-0392772. in approval of the ethical protection of the participants within my project; I filled out an application for their review for protection of participants identity. The application was sent to the IRB department along with the completed and administrator signed Site Approval Form filled from the research site that oversees the

project. The steps for approval from the IRB was conducted after my chair had uploaded the proposal into MyDR for the University Research and Review to review, and approval was obtained, and I identified a site for my project to take place.

## Analysis and Synthesis

The systems used for recording, organizing, and analyzing the information was by excel spread sheet. There was no tracking needed for this project. The utilization of the U.S. postal service was the delivery service used to send the project materials. The computer program ZOOM was utilized for the review of the educational module with the participants prior to them taking the posttest and filling out the evaluation form.

Some of the procedures that will be utilized in order to assure the integrity of the evidence are:

1. Not utilizing digital testing methods, I used paper format, in order for results not to be manipulated or skewed.
2. Used unmarked, untrickable methods of communication in regards to the pre and post-tests, evaluation forms, and envelopes.
3. Participants are health care professionals that was not be identified, it was not necessary for the context of this project.
4. There was no patient participation, there was no patient scenarios utilized in this project.
5. I utilized reputable resources in my research, in order to avoid inappropriate manipulation, and incorrect data.

6. I used evidence-based practice research, along with peer reviewed articles.
7. Within the pre and posttest and the evaluation form, the questions selected had a combination of yes and no answers, multiple choice, in order not to recognize hand writing or specific terminology that created bias in the project outcomes.

The analysis procedures that were utilized for this doctoral project was a Gannt Chart in order to stay on task for the time line and the objectives that need to be achieved. Another analysis procedure that was used was the Fitzpatrick evaluation model, ensuring that the project was effective through the design and by reviewing the participants gain of knowledge after the completion of this program. The last analysis procedure was after the completion of the project. An unbiased analysis was made of the outcomes of the project in order to evaluate if the module, and review program had met the project goals and addressed the practice-focused questions. The procedures to evaluate the post and pretest scores include descriptive statistics and comparison of scores with percentages to identify improvement in knowledge. Basic proportions and percentages were utilized as well. Such as the example of Question #1 pretest will show 75% accuracy in response and the posttest shows a 100% accuracy totaling a 25% improvement rate after the educational module presentation.

## Summary

In summary, addressing the practice problems of this project; the gap in providing healthcare for patients living with diabetes due to lack of collaboration, and the knowledge deficit of health care providers when managing diabetes, is vital. It was important to focus on the purpose of implementing positive change within society by educating health care providers on the management of diabetes.

The alignment of the practice-focused question and the participants of the project was vital for successfully addressing the practice problem. The participants for the purpose of this project were health care providers that all manage the care of patients living with diabetes, however they are all from different specialties in the health care profession. Therefore, the project could in fact develop collaborative practices, and increased the knowledge on the use of the inhaled insulin, Afrezza in order to promote better patient outcomes.

It was important to use reputable sources of evidence that have direct relationships with the practice-focused questions and the project goals. When designing a project, it is necessary to define all terminology that could be foreign to participants and stakeholders, this assures that clear, concise dialogue is presented during the project phases. There are many ways to gather, track and obtain necessary research information and it is vital to choose tools and techniques that will properly collect evidence that aligns with the project and promote reliability in gathered information.

When choosing the participants for a project it was vial to ensure that they have a profound purpose within the goals of my project. The purpose for the diversity in

specialty areas of health care providers was that I chose for this project was to promote collaboration within managing care for patients living with diabetes. It was important to implement ethical tactics in order to promote privacy and protection for all participants within the project, this also assisted with the prevention of bias influence in the project outcomes.

It was imperative to utilize effective analysis and synthesis methods in order to maintain the integrity of the project outcomes and evaluations for effectiveness. Using specific procedures can assure that research findings and Implications for the project were accurate without specific influence or delays in the expected time line.

## Section 4: Findings and Recommendations

Diabetes is on a global rise, and there is a definite gap in providing care for the population of people living with diabetes. One of the largest gaps in providing care for patients living with diabetes, is ensuring that health care providers stay apprised of the ever-evolving diabetic treatment plans and medication regiments. Another identified gap is individualizing diabetes plans of care according to a patient's needs to assure adherence to prescribed treatment regimens. Individualized plans of care can help to assure adherence to prescribed treatment regimens.

There are two major contributors to the gap in providing health care for diabetes management: the lack of education for health care providers on the most current practice guideline for individualized treatment plans for patients living with diabetes, and the lack of collaboration between health care professionals when managing diabetes.

The guiding practice-focused questions for this project were:

1. If health care providers are educated on the guidelines for the use, administration, and effectiveness of the inhaled insulin, Afrezza, will they be more likely to utilize this medication regimen for improving the quality of life for patients living with diabetes?
2. Will the development of this educational module improve collaborative measures within the health care professional's practice for the growth and improvement of the management of care for patients living with diabetes?

The ultimate goal of this educational module was to improve, support and educate the global population on the benefits of using the inhaled insulin, Afrezza, by means of educating healthcare providers first.

This program did enhance health care providers' knowledge by delivering an educational module on the use of the inhaled insulin, Afrezza. Use of this educational module could improve and promote individualized patient care plans. I developed the educational program to promote collaboration with subsequent health care providers or specialists to improve continuity and quality of care for patients that are living with diabetes.

## Findings and Implications

A pre and post-test were given to the 20 participating health care providers to evaluate their knowledge level on four specific areas of focus with the management of diabetes: diabetes treatment regimens; diabetes drug class updates; the guidelines for treatment with the inhaled insulin, Afrezza; and the health care provider's collaborative practice habits when managing diabetes. The utilization of the pre- and post-test was influenced by the Kirkpatrick evaluation model.(see Figure 2). Several researchers noted that Kirkpatrick's approach has been popular as a model for evaluating learner outcomes in various training programs (Kurt, 2018). This model has contributed to educational evaluation with a focus on program outcomes through the evaluation of how well the

content was absorbed on four levels: reaction, learning, behavior, and results (Kurt, 2018). The reaction level is focused on how the participant reacted to the program, and end-user feedback. The learning level is focused on if the participants' knowledge base improved, while the behavior level is focused on if their practice was improved by the program training. Lastly, the results level is used to determine if the clinical outcomes or overall program statistics improve.

At the beginning of this research project, I mailed 22 pre-tests were mailed out through the U.S. mail service to health care providers in various organizations and practices. All 22 pre-tests were received back; however, two had to be eliminated on terms of bias that would have interfered with the study outcomes due to receiving them back via fax and email. Only 20 were received back through the U.S. mail service in the provided unmarked, untraceable form as the directions implicated. After receiving the pre-tests back, I sent a packet via U.S. Postal Service to each participant. Each package included instructions for guidance; an invitation to a Zoom conference for a program review; a post-test; the education module with materials on the inhaled insulin, Afrezza; and a return, self-addressed envelope. To review the educational module and materials, I conducted a Zoom conference that all 20 participants logged on and joined that lasted 45 minutes on July 8, 2021 at 1200 CST. Instructions were reiterated to the participants for clarification on how to complete and return the post-test through the U.S. Postal Service. Time was allowed for questions and answers at the end. All 20 post-tests were received in unmarked, nontraceable envelopes within 7 days after completion of the Zoom

conference. I analyzed the data and calculated the results using statistical format. The questions, answers, and statistical gains are displayed in Table 1

**Table 1**

*Pre- and Posttest Results*

| Questions | Pre-test Answers | Post-test Answers | Measured Difference Between Pre- and Post-test outcomes | Statistical Improvement |
|---|---|---|---|---|
| 1. Are you familiar and comfortable with utilizing the most current diabetes treatment regimens? | Yes-10<br>No-4<br>Not sure-6 | Yes-15<br>No-2<br>Not sure-2<br><br>Unanswered-1 | Yes-increased by 5/50%<br>No-decreased by 2/50%<br>Not sure—decreased by 4/66%<br>One question eliminated | Improved 50% of participating health care providers knowledge and comfort level with the utilization of diabetes treatment regimens. |
| 2.Are you familiar and comfortable with the guidelines for treating patients with the inhaled insulin, Afrezza | Yes-0<br>No-18<br>Not sure-2 | Yes-17<br>No-3<br>Not sure-0 | Yes-increased by 17/85%<br>No-decreased by 15/83.3%<br>Not sure-decreased by 2/100% | Improved 85% of participating health care providers knowledge base on the utilization of the inhaled insulin, Afrezza. |
| 3.Will you prescribe the inhaled insulin Afrezza to manage type 1and type 2 diabetes? | Yes-2<br>No-18<br>Not sure-0 | Yes-12<br>No-5<br>Not sure-3 | Yes-increased by 10/80%<br>No-decreased by13/72.2%<br>Not sure-increased by 3/300% | Improved 80% participating health care providers that will prescribe inhaled insulin Afrezza for managing diabetes. |
| 4.As a health care provider do you | Yes-5<br>No-5 | Yes-15<br>No-3 | Yes-increased by 10/100% | Improved 100% participating health |

| | | | | |
|---|---|---|---|---|
| practice collaborative habits when managing patients with diabetes. | Sometimes-10 | Sometimes-2 | No-decreased by 2/40%<br>Sometimes-decreased by 6/80% | care providers ideation of collaborative habits when managing patients with diabetes. |
| 5.Do you think utilizing the inhaled insulin, Afrezza could improve the quality of life for patients with diabetes? | Yes-8<br>No-0<br>Not sure-12 | Yes-18<br>No-0<br>Not sure-2 | Yes-Increased by10/125%<br>No-unchanged<br>Not sure-decreased by 10/125% | Improved by 125% of the participating health care providers believe that utilization of Afrezza could improve patient quality of life. |
| 6.Do you think utilizing the inhaled insulin, Afrezza could promote improved patient outcomes, due to improved medical adherence? | Yes-5<br>No-5<br>Not sure-10 | Yes-15<br>No-2<br>Not sure-3 | Yes-Increased by 10/125%<br>No-decreased by 3/60%<br>Not sure-decreased by 7/70% | Improved by 125%of the participating health care providers believe that utilization of Afrezza could improve medical adherence and promote better patient outcomes. |
| 7. Do you think utilizing the inhaled insulin, Afrezza, with concomitant use of Continuous glucose monitors could decrease global biohazardous materials, such as insulin syringes and hypodermic needles and lancets? | Yes-8<br>No-10<br>Not sure-2 | Yes-19<br>No-0<br>Not sure-1 | Yes-increased by 11/137.8%<br>No-decreased by 100%<br>Not sure decreased by 1/50% | Increased by 137.8% of participating health care providers believe that utilization of Afrezza could decrease biohazardous materials. |
| 8. Do you think the utilization of inhaled insulin, Afrezza could reduce global expenditure on diabetes management, such as supplies, medication costs and rehospitalizations due to diabetes? | Yes-4<br>No-12<br>Not sure-4 | Yes-12<br>No-2<br>Not sure-6 | Yes-increased by 8/200%<br>No-decreased by 10/250%<br>Not sure-decreased by 2/ 50% | Increased by 200% of participating health care providers believe that utilization of Afrezza could decrease global expenditure on diabetes management. |

| | | | | |
|---|---|---|---|---|
| 9. Do you think that this program/educational module will influence your practice in the future when managing diabetes? | Yes-2<br>No-12<br>Not sure-6 | Yes-19<br>No-0<br>Not sure-1 | Yes-Increased by 17/850%<br>No-decreased by 12/100%<br>Not sure-decreased by 5/83.3% | Increased by 850% of the participating health care providers believe that this program/educational module will influence their practice with managing diabetes. |
| 10. Do you think that this program will allow you to offer your patients an alternative method to treating diabetes? | Yes-5<br>No-10<br>Not sure-5 | Yes-20<br>No-0<br>Not sure-0 | Yes-increased by 15/300%<br>No-decreased by 10/100%<br>Not sure decreased by 5/100% | Increased by 300% of the participating health care providers believe that this program/educational module will give them an alternative method to treating diabetes. |

I developed this educational module with the following goals of providing positive social change: helping health care providers stay apprised of and educated on the evolution of an alternative method of administering insulin, improving the quality of life for the population living with diabetes, reducing health care costs, and reducing of biohazardous material to promote echo-friendly measures.

**Figure 1**

*DATA Model*

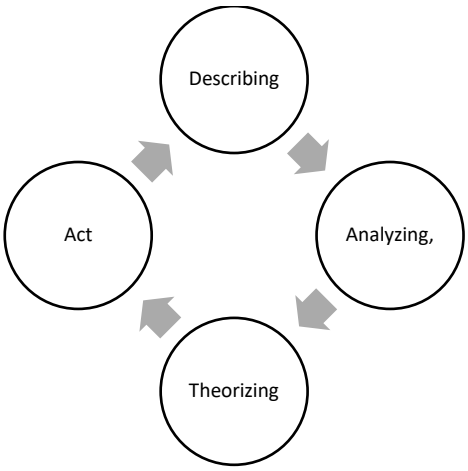


**Figure 2**

*Kirkpatrick's Evaluation model that influenced pre- and post-test*


## Recommendations

This study's outcomes showed a positive gain in providers' knowledge on the use of the inhaled insulin, Afrezza. More than half of the participants also gained a better understanding of collaboration when providing care for diabetes. If replicated with use of the educational module, these findings could improve the quality of care for patients living with diabetes and promote better health outcomes. The outcomes of this study also

implied that a 137.3% change was made in the belief of the participating health care providers that with the use of inhaled insulin and CGM's that biohazardous material could be reduced. This educational module/program could promote social change due to the positive gain of knowledge that was demonstrated by the pre- and post-test evaluation tool. An 850% gain was accomplished with the utilization of this module, in respect to the participants changing their opinions on the fact that this program would influence their future practice.

## Strengths and Limitations of the Project

One of the strengths of this project was that all biased material was eliminated upon the recognition and receipt of electronically submitted pre-tests allowing trackability. Another strength of this project was that the participants were health care providers from various organizations and types of health care practices, which did not limit the width of knowledge base to solely diabetes. A final strength of this program was the ability to stress the importance of and promote collaborative practice in all realms of health care.

One of the limitations of this project was the size of the study group, which was limited to 20 people. Another limitation of this project was that there was no evidence based-practice patient examples used to reinforce statistical findings. A final limitation was that the time frame of the study was limited, based on one study group, and not performed more than once to develop validity through repetition.

## Section 5: Dissemination Plan

My future plans for the dissemination of this DNP doctoral project include speaking at the Advanced Diabetes Care and Education Conference. I have recently been asked to speak at a MannKind Corporation meeting to educate other health care providers on the guidelines for the utilization for the inhaled insulin, Afrezza. Another formal plan for disseminating this project and the final outcomes is to provide the practicum location with the study outcomes. This will be done to promote the theory of organizational change. This organization uses the inhaled insulin, Afrezza, for the treatment of their patients living with diabetes often, and promoting the use of the theory as well could benefit to their corporation's advancements.

This educational program was structured to advance health care providers' knowledge base on the guidelines and use of the inhaled insulin, Afrezza. The aim of the project was to promote positive social change through collaboration, improving medical adherence, reducing global expenditure for the treatment of diabetes, and reducing biohazardous material by educating health care providers first.

### Analysis of Self

As a nurse practitioner, scholar, and the project manager, it was important for me to utilize the six stages of Blooms Taxonomy: create, evaluate, analyze, apply, understand and remember. (see Vanderbilt University Center for Teaching, 2017). The creation of this educational module and research project was from my professional experiences with the utilization of the inhaled insulin, Afrezza. The positive experiences that I professionally have witnessed through evidence-based practice were intriguing. It

was of great interest to me as to why there was not more information or education available on this alternative method of administering insulin.

The evaluation stage was implemented throughout the entire project because, I wanted to ensure that this educational program had meaningful use and could help promote positive change within health care, and patients' lives. I constantly evaluated the progression and the need for necessary changes throughout each step.

During the analyzation phase, I wanted to ensure that I assisted other health care professionals that manage the care for patient's living with diabetes to understand the guidelines for the inhaled insulin, Afrezza. I also wanted the learner to understand how inhaled insulin could impact a patient's life positively if utilized correctly. I have personally witnessed many patients successfully reach optimal A1C reduction, and daily glucose levels with the Afrezza medication regiment, and as a health care provider, it is gratifying to watch your patients succeed.

Within the application process, I wanted to make sure that the information I was presenting was effective and understandable to promote evidence-based practice. It was important for me to convey to other health care providers that the utilization of the inhaled insulin, Afrezza, could literally change some of their patients' lives. As a health care provider, Afrezza has given me a different perspective on insulin administration. Through the application process my goal was to share my knowledge by clearly communicating the benefits of this medication to patients living with diabetes.

In terms of the phase of understanding, it was valuable to have had the opportunity to study, research, and experience evidence-based practice and theories

related to the use of the inhalable insulin, Afrezza, for over a year and a half prior to this study. I wanted to make sure that the participants of this project understood this medication regiment; however, if they did not fully understand the guidelines for inhaled insulin after the educational module was completed, they would have ample resources to further explore.

When the educational module and presentation of review was completed, I wanted to ensure that health care providers remembered the content. It was important for me to make the information, accessible and easy to interpret. I wanted to place the obligation for patient education on the health care providers and help them understand the importance of staying apprised on the evolution of pharmaceutical regiments. I also wanted to assist with conveying the need for collaborative practice, and help them remember its importance for improved patient outcomes. No single person can possibly know and remember everything when it comes to the millions of disease processes and their detail.

## Summary

In conclusion, my goal of creating an educational module for health care providers to improve the management of diabetes with the utilization of the inhaled insulin, Afrezza, proved to be effective through this project study. This educational

module is a possible way of taking positive steps towards improving the quality of life and health outcomes of patients living with diabetes. This project also proved that improving health care providers knowledge on managing diabetes with the inhaled insulin, Afrezza, could promote positive social change. The utilization of inhalable insulin could lower the overall global expenditure on diabetes and the multiple comorbidities that come with this disease process. The use of Afrezza could also lead to positive change in health care by improving patient outcomes and medical adherence as well as decreasing hospitalizations due to diabetic influence.

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