Utilizing Evidence Based Practice to Reduce Hemoglobin A1c Levels in Primary Care by Implementing an Increase in the Frequency of Office Visits

Mary Smith Williams

A DNP Project
Submitted in Partial Fulfillment of the Requirements for the Degree of Doctorate of Nursing Practice, College of Nursing and Speech Language Pathology
Mississippi University for Women

COLUMBUS, MS

May 2017

Author Note

This project was not supported by any outside funding. There are no required disclosures.

Dr. Carey McCarter, DNP, Dr. Alena Lester, DNP and Dr. Teresa Hamill, DNP, Faculty Advisors, are all thanked for their assistance in the preparation of this manuscript. Dr. Virginia Smith, DNP is thanked for her input into the project manuscript as well.

Correspondence regarding this project should be addressed to Mary Smith Williams at paulfandmaryw@charter.net.
Acknowledgements

First, I would like to thank Dr. Carey McCarter. She was always there to answer questions and she always did so with a smile and in her soft-spoken manner. Her expertise in the field of Diabetes was very helpful. She was always encouraging and always made time to speak with me.

Secondly, I thank Dr. Alena Lester. She always has a way of inspiring with her upbeat attitude. Her smile and positivity are seemingly never ending. Her input was much appreciated.

Next, I thank Dr. Teresa Hamill. Her wisdom and knowledge are priceless. She has a way of seeing deeply into every aspect of a situation. She has a way of expressing herself with the utmost grace and kindness.

Dr. Virginia Smith took time away from her busy schedule to offer input and constructive criticisms when she did not have to do so. It is much appreciated.

Last, but certainly not least, my wonderful husband, Paul. He has been my rock since I began this journey. He never doubted that I could complete this project even on days when I doubted myself. He was always there, behind the scenes keeping order in an otherwise chaotic life. He has been my biggest supporter.
Abstract

Diabetes Mellitus is one of the leading chronic diseases in the United States as well as in the world. It is a disease that becomes progressively more difficult to manage as time goes by with each patient. It costs the patient as well as the public. It costs in terms of health as well as monetary expenses.

Providers must use every possible resource to manage this disease. New medications, referrals to specialists such as endocrinologists, and interprofessional collaboration are essential elements of complete and therapeutic care for the patient.

Even though providers can utilize the best technology, the most advanced medications and the knowledge of the experts, ultimately it takes the work of the patient to manage the disease. If the patient is not invested in his or her own care, the results will not be optimal. Some patients do not understand the need for diligent self-care.

Twice yearly or less visits in primary care are many times not enough to keep the Hemoglobin A1c (HbA1c) at or near normal. Many times, it takes close monitoring, repeated education and frequent assessments by the provider to prevent the patient from developing complications related to DM.

Studies have shown that better preventive care can decrease complications and help the patient live a longer, healthier life. Providers should consider more frequent office visits for patients with elevated HbA1c levels as this offers not only an opportunity for the provider to assess the patient and make needed changes in care but also gives the patient time to ask questions, gain clarifications on unclear topics and increases the patient’s participation in his or her healthcare.
Table of Contents

Abstract ........................................................................................................................................03

Introduction .................................................................................................................................05

Significance of the Problem .........................................................................................................07

PICOT Question ..........................................................................................................................10

Definition of Terms ......................................................................................................................10

Literature Review .........................................................................................................................11

Conceptual Framework ..............................................................................................................14

Project Implementation ..............................................................................................................15

Data Analysis ...............................................................................................................................19

Project Outcomes .......................................................................................................................20

Limitations and Barriers ..............................................................................................................20

Discussion an Implications .........................................................................................................20

Recommendations ......................................................................................................................21

References ....................................................................................................................................22

Appendix A .................................................................................................................................26

Appendix B .................................................................................................................................27

Appendix C ....................................................................................................................................28
Introduction

Diabetes Mellitus (DM) is a chronic health issue affecting nearly 30 million adults in this country (Urquhart, 2012). A normal Hemoglobin A1c (HbA1c) level should be between 4.4% and 6.4%. When a HbA1c level is 6.5% or higher it is considered “high” and therefore is one of the criteria used to diagnose DM. Many times, the first treatment is diet, exercise and lifestyle changes. If the patient is motivated, and the HbA1c level is not extremely elevated, the condition may be controlled without medication. More often (than not), however, the patient requires medication and close lab monitoring. Many patients do not realize the necessary changes that need to be made to control their DM with lifestyle modifications alone (Jansink, Braspenning, & Keizer, et al., 2012). Many patients require an extensive amount of education.

If DM is not controlled, many complications can arise. The monetary costs of these patients’ healthcare can be very expensive. If not well-controlled in the clinic setting, the patient presents to the emergency department for treatment related to this condition. The total estimated cost of medical care for DM in the United States rose from $174 billion in 2007 to $245 billion in 2012 (Diabetes Care, 2013). That is a 41 percent increase in the cost of medical care related to DM in only a five-year time frame. Lorenzo (2013) stated that compliance is needed to ensure high quality outcomes in a chronic disease. Increasing interaction time between the provider and patient while offering education about the disease at each visit is a great way to increase compliance. A consistent HbA1c level of 7.0% saves approximately $279 per year per patient. Regular evaluation and assessment of the patient with DM is an essential element of controlling the disease and therefore giving the patient the best opportunity at the best outcomes (Siu, Yuk, Fangfang & Lam, 2015).
In addition to the financial costs, DM affects the entire body. The disease can increase one’s risk for cardiovascular events, kidney failure, loss of eyesight, loss of limbs and other health problems. Uncontrolled diabetes is the leading cause of kidney failure and in 2011 it accounted for 44 percent of all the new cases of end-stage renal disease (ESRD). If two adults are the same age, the one with DM has 1.5 times higher risk for natural death (regardless of the cause) than the one without DM. Approximately 60 percent of non-traumatic lower-limb amputations occur in patients with DM (Siu, et al., 2015). These numbers are staggering and they are not improving.

Each year the number of newly diagnosed cases rises more than the previous year. In 2010 alone there were nearly 1.9 million adults in this country newly diagnosed with DM. In patients age 18-44 years, the patients who are newly diagnosed are 80 percent more likely to require insulin within the first two years of diagnosis (Urquhart, 2012).

This disease has progressed to the point that many providers feel they do not have the necessary staff or time to adequately give the needed care to these patients. Many patients are not seen frequently enough in the office for the provider to adequately assess for changes in the patient status. By the time a patient is seen for a follow-up visit the HbA1c level has increased significantly and the patient has become very lax regarding lifestyle modifications.

During this project patients with hemoglobin A1c (HbA1c) levels > 8.9% were scheduled to be seen more frequently. They were all seen in the clinic at least every three months. Before the beginning of the project, this was not being done consistently. Before the project began, some patients were being seen for follow-up visits at three months, some at six months and even some at nine months or even at one year. It was totally left to the discretion of each individual provider and there was no standard of care, and no consistency.
Studies have shown there is a direct relationship between visit frequency and clinical outcomes (Brummel, Soliman & Carlson, et al., 2013). More specifically, patients who had quarterly visits, were less likely to have worsening glycemic control and more likely to have improved HbA1c levels (Phan, Hossain, Lawless, & Werk, 2014). It has also been shown that the more that different disciplines each work with the same patient to achieve a common goal the better the end result.

At the time of the office visit, the provider assessed lab results, spent time on patient teaching, answered any questions for the patient, and offered encouragement and direction. It was also a good opportunity for the provider to adjust or add medications as necessary. The provider made the needed referrals as appropriate to the nutritionist, certified diabetic educator, weight loss program, and to the group diabetes classes. The goal was to decrease the higher HbA1c levels and bring them to a normal or closer to normal range. Reducing the HbA1c levels would therefore reduce the patients’ risk for developing one or more of the known complications that arise from uncontrolled or under-controlled DM. With fewer complications, patients can live a longer, healthier life and the financial cost of their healthcare will be decreased.

**Significance of the Problem**

Many patients with abnormal hemoglobin A1c levels have not been assessed often enough by a provider to best serve the patient’s health. There have been instances in which patients with uncontrolled HbA1c levels were not assessed as often as needed. In the past, many patients with elevated HbA1c levels were seen every 6, 9, or even 12 months. These patients did not receive the needed referrals, education or medication adjustments needed to help them manage diabetes. It was up to the individual provider how often each patient was scheduled in the clinic. While many providers were assessing patients with elevated HbA1c levels more often,
there was no consistency within the healthcare system. The Veterans Health Administration needed to develop a set policy on how often to assess patients with elevated HbA1c levels.

The implemented project’s purpose was to identify those patients by utilizing a chart review method within the specific primary care clinic whose hemoglobin A1c (HbA1c) level is >8.9 percent. Those patients were then seen in the primary care clinic more often than what had previously been the normal procedure for these patients. These patients were seen in the clinic for routine follow up care at least every three months and their response to the increased frequency of visits were closely monitored. Each patient’s HbA1c level was then compared at each visit with his or her past HbA1c levels to assess for level of improvement. Each patient’s lab results were only compared to his or her previous results. No patient’s results were compared to any other patient’s results. The end goal desired with seeing these patients more often was to bring the HbA1c levels to normal levels (4.4-6.4 percent) or at least closer to the normal range.

Each patient who was seen in the clinic more frequently also received the same referrals as other patients seen less often who had lower HbA1c levels. These referrals included: weight loss program, nutritionist, certified diabetes educator referral, group diabetes education referral and home tele-monitoring referrals. Each patient was also referred for tele-retinal examinations. Foot exams were completed at each visit. At each primary care visit, the patients did receive individual education regarding diabetes from the provider. Each patient was given the opportunity to ask any questions. Medication adjustments were also made at the time of the visit if indicated.

The Nurse Practitioner (NP) has an obligation to identify needs for the patients as well as the community. That obligation extends into looking for ways to meet the needs of the patients and identifying modalities to be used for that purpose. Diabetes Mellitus (DM) is a chronic
health problem that affects 29 million Americans and that number is continuing to increase with each passing year. The NP must identify ways that can help control the condition and help the patient to live a fuller and more active life after having been diagnosed with DM.

Both incidence and prevalence of DM have increased steadily for several decades. This has resulted in large increases in the total burden of DM related morbidity (Nichols, et al., 2015). It is for this reason that healthcare providers must take a more proactive role in the management of chronic diseases. The disease should be managed and not just treated during worsening episodes.

It is known that patients who are not seen regularly for their primary care appointments are more likely to present to the emergency departments due to complications. In a study by Nuti, Lawley, and Turcan, et al. (2012) 8787 patients were monitored; 1421 of those patients did not attend regularly scheduled primary care appointments. Of the ones who did not attend the primary care appointments, 95 eventually were hospitalized with an average hospital cost in excess of $11,000. Dusheiko et al. (2011) stated that diabetes requires timely and effective management in order to avoid emergency room visits. They examined the relationship between the quality of glycemic control in family practice and hospital admission rates. They discovered that patients with moderate HbA1c levels (7.4-10.0) had significantly lower hospital admissions related to hyperglycemia than did those patients with poor HbA1c levels (>10.0).

It was thought that if all patients with HbA1c >8.9 percent were scheduled for follow up appointments in the primary care clinic every three months, there would be less patients presenting with high blood glucose levels in the emergency departments. These visits, besides being stressful for the patients, cost thousands of dollars for the patient as well as the public.
Fewer patients with emergency room visits resulted in better quality of life for the patients and less expense for the patient. In addition, it results in a positive outcome for all involved.

**PICOT Question**

The targeted population in this project was patients with a diagnosis of DM and HbA1c >8.9% in the Veterans Health Administration System. There should be a uniform approach to scheduling follow-up appointments with patients who have uncontrolled DM. The intervention of the project was to schedule these patients with HBA1c levels >8.9% to be seen in the clinic at 3 month intervals. The comparison was then made during each patient’s return appointment of the present HbA1c level to previous HbA1c levels of the same patients. Outcomes were measured by assessing numerical HbA1c level decreases and reporting the information to Veterans Health Administration. The timeframe was a period of approximately 12 months. The PICOT question was “Would reducing the amount of time between office visits reduce the hemoglobin A1c level for patients with Diabetes Mellitis?”

**Definition of Terms**

*Diabetes mellitus.*

*Theoretical.* A chronic disease that involves abnormal insulin secretion, resistance to insulin in target tissues, and/or decrease in insulin receptors (Hollier & Hensley, 2016).

*Operational.* For the purposes of this project, diabetes mellitus is a chronic illness that involves disturbances in the body’s ability to maintain a healthy glucose level. It is a condition of concern for those who are diagnosed with this condition.
Hemoglobin A1c.

Theoretical. Hemoglobin A1c (HbA1c) is the measurement of a blood test that determines the average blood glucose level over the last approximately 90 days (Medical Dictionary Online, 2016).

Operational. For the purposes of this project, it is the results of a venous blood sample taken in the clinic setting from a population of patients diagnosed with DM.

Office Visit.

Theoretical. An office visit is a visit made by patients to health service provider’s office for diagnosis, treatment and follow-up (Medical Dictionary Online, 2016)

Operational. For the purposes of this project, an office visit is the time when a patient comes into an outpatient clinic and is assessed and treated by a health care professional.

Literature Review

Since the project focused on the importance of office visit frequency as it relates to hemoglobin A1c levels, it was important to review the literature to discover what evidence was available. A total of 56 articles were reviewed. There were 8 articles retained that best supported the need for this project in a primary care outpatient clinic. The search strategy is in Appendix C.

Oberg et al. (2012) in an observational study showed that more frequent visits to a provider resulted in significantly lower HbA1c at 6 months after baseline. This study also demonstrated that there was a greater reduction of the HbA1c in the study cohort than in the group who did not see a provider as often. The patients were noted to have more frequent self-care practices such as checking blood sugar more often, following a healthier diet and increased physical activity.
Asao, McEwen, Crosson, Waitzgelder, and Herman (2014) showed that there was a direct correlation in the frequency of office visits and better outcomes. They stated that there are no randomized trials to determine the ideal revisit frequency. They began the study with 11,927 participants. Revisit frequency varied widely based on the provider preference, the patient’s sex, the patient’s socioeconomic status, and the patient’s education level. In this study, women had an overall higher revisit frequency than did men. Lower income patients had less frequent visits than their higher income earning counterparts. It was also noted that the higher education level of the patient, the more likely they were to have more frequent visits. Overall, patients achieved blood glucose goals more quickly with 3-4 visits per year. It was noted that 6 or more visits per year did not produce better results than 3-4 visits per year.

Dusheiko et al. (2011) stated that diabetes requires timely and effective management to avoid emergency room visits. They examined the relationship between the quality of glycemic control in family practice and hospital admission rates. They discovered that patients with moderate HbA1c levels (7.4%–10.0%) had significantly lower hospital admissions related to hyperglycemia than did those patients with poor HbA1c levels (>10.0%).

Wieland et al. (2012) carried out a study on Somali immigrants that was primarily focused on the disparities related to the diabetic management they received. In the course of their study, they found that there was a relationship between frequency of visits with the provider and the HbA1c levels. Patients who saw their provider more often had a significantly lower HbA1c than those who missed appointments.

Blood glucose monitoring and early intervention are very important in controlling blood glucose and achieving a target HbA1c level. Being evaluated regularly by one’s provider in order
for the provider to identify and sustain improvements in care are key elements of diabetes care (Fung, Wan, Jiao, & Lam, 2015).

Diabetes Mellitus affects approximately one-fourth of America’s veterans. Lower-limb amputations (LLA) are costly in terms of finances but also in terms of quality of life for the patient who incurs a LLA. In 2010, the cost per patient with LLA was in excess of $60,000.00. Over 3,400 of these amputations were performed in the VHA Health Care System in 2010. The cost is staggering. Many of these surgeries could have been avoided if the patient’s HbA1c had been better controlled. As the number of veterans with diabetes continues to grow in this country we need to ensure that the highest level of quality care is being delivered so as to prevent these and other complications that result from uncontrolled diabetes (Franklin, Rajan, Tseng, Pogach, & Sinha, 2015).

Nuovo (2009) conducted a study in which he invited patients with Type 2 Diabetes Mellitus (DM) to come to planned visits to improve glycemic control, blood pressure and lipid levels. They were scheduled to meet with their provider for 15 minute sessions. The comparison group was those patients who did not accept the invitation to meet for visits. The study group did not receive any additional treatments other than the additional visits if they accepted them. It was noted in this study that the patients who accepted the planned visits had better glycemic control when compared to the group who did not accept the planned visits. HbA1c levels improved approximately 1.3% from baseline at the 6-month time frame and patients reported improvements in self-care from the baseline. He found it was possible that the planned visits served to re-engage the patient in their own diabetes care.

Patients who do not show for their primary care appointments are more likely to have an inpatient hospital stay due to complications of DM. Patients with DM who have not attended
their primary care appointments in the last six months have a 60 percent greater risk for hospitalization than those patients who attended their primary care appointments. Patients who attended their primary care appointments had a lower HbA1c levels. The study showed that patients who no-show their primary care appointments may have a more reactive approach than proactive when attempting to manage their diabetes (Nuti, Lawley, Turkcan, Tian, Zhang, Chang, Willis, & Sands 2012).

Ryan, Jennings, Vittoria, and Fedders (2013) studied whether multiple diabetes education sessions would improve blood sugar control. The curriculum was aligned with American Diabetes Association (ADA) guidelines. It was noted at six months that HbA1c levels decreased on average one percent for those patients who attended the sessions. It also improved the patients’ knowledge about the disease process. In addition, it suggested ways for the patients to improve their outcomes with lifestyle changes. It was also noted that secondary prevention was likely to prevent complications as well as offset costs of managing complications.

**Conceptual Framework**

The Social Ecological Model was utilized as a framework for this project. This model focuses on the factors (both internal and external) that affect behavior and assists with developing successful programs through social environments. Multiple levels of influence are used in social ecological models such as individual, interpersonal, organizational, community and public policy. (Butts, J. & Rich, K., 2015).

The Social Ecological Model is a social work model that was introduced in the 1970’s and formalized into a theory in the 1980’s by Urie Bronfenbrenner. He postulated that in order to understand human development, the entire ecological system in which the person grows and develops must be taken into consideration. The person does not live in a shell. Everything he or
she does is somehow related to other circumstances. Social Ecological Model acknowledges that one must factor in personal as well as environmental issues.

In order for long-term change to occur, it must be noted that seeing patients more often leads to lower HbA1c levels. Lower HbA1c levels lead to fewer complications in the patient. Fewer complications lead to more cost-effective healthcare.

**Project Implementation**

In the project, the population that was both affected and served was the patients with a diagnosis of Diabetes Mellitus (DM). The project focused specifically on those who also had a Hemoglobin A1c (HbA1c) level >8.9%. This level is too high to be considered healthy. Normal HbA1c level is 4.4%-6.4% (Hollier & Hensley, 2016). Sustained elevated HbA1c levels lead to kidney failure, loss of limbs, loss of eyesight and increased risk of cardiovascular events.

The project practice setting was a Veterans Health Administration (VHA) Community Based Outpatient Clinic (CBOC). The only individuals served in this clinic are veterans. It is a primary care clinic that addresses both acute and chronic illnesses. It was an appropriate setting for the project as primary care is the area that sees most of the patients with a diagnosis of DM. Although some patients do see endocrinology for DM diagnosis, the majority of patients are treated in a primary care clinic.

In the particular clinic where the project took place, there is one medical doctor (MD), one family nurse practitioner (FNP), one registered nurse (RN), one licensed practical nurse (LPN), one medical assistant (MA), two medical clerks, one phlebotomist, and one tele-retinal assistant who sometimes functioned as MA or medical clerk if one of those individuals were out of the clinic that day.
All major changes in policy and procedure are made at the administrative level in the VHA. Since the particular outpatient clinic is overseen by the Memphis, TN. VISN, all policies are directed from Memphis. There are many different committees involved with decision making and no one at the project clinic is involved at any level with these decisions. Recommendations can be made to administration in Memphis but changes are not promised and many times responses are not even received.

The stakeholders in the particular project were multiple. First, the veterans (patients) who were seen more often if the HbA1c warranted. More frequent office visits will result in lower HbA1c level and therefore better quality of life for the veteran. A 1% reduction in HbA1c level has been associated with a 10% reduction in DM related deaths (Lorenzo, 2013). Secondly, the providers who assessed the patients more often were better acquainted with the patients and were able to make any needed changes to the patient’s plan of care. This allowed for an opportunity for education. Health literacy is directly associated with lower HbA1c levels (Woodard, Landrum, Amspoker, Ramsey, & Naik, 2014). Lastly, the VHA is a stakeholder. With healthier patients there will be less chance of complications from DM. Less complications will mean less cost for hospitalizations and emergency room visits as a result of uncontrolled DM.

Currently there is no standard for when to return for follow up visits for patients with elevated HbA1c levels. All of the providers need to be performing on the same level. All patients, no matter what provider to which they are assigned, should receive the same high quality care. If all patients with elevated HbA1c levels were seen back in the clinic at 3 month intervals, each one would have a greater chance of improving his blood sugar levels. Currently, the return to clinic appointment timeframe is entirely up to the individual provider.
The project took place in a community based outpatient clinic (CBOC) approximately 100 miles from the main VA hospital which is located in the southern United States. The clinic only serves veterans. The methodology for the particular project was to have patients with Diabetes Mellitus (DM) and a hemoglobin A1c (HbA1c) level >8.9% was scheduled in the primary care clinic at least every three months. At each office visit, the patients were assessed by the primary care provider. This was an opportunity for additional education by the provider as well as professional interaction between the provider and that patient. A higher quality professional relationship resulted in a higher level of trust in the provider by the patient. More trust did result in better compliance by the patient with disease management practices.

Prior to beginning the project, a chart review of the particular provider’s patients with a diagnosis of DM was completed. Only those patients with a HbA1c >8.9% were included in the project. Each of these patients was scheduled for follow-up visits with the primary care provider at least every three months. The benefits of being seen in the clinic more often were discussed with each patient in detail. It was then the patient’s decision whether to be seen more frequently. Patients were always free to disagree with any or all of the provider’s recommendations if they chose to do so.

HbA1c levels were monitored every three months by the provider and compared to that particular patient’s past HbA1c levels to determine a trend. Was the HbA1c improving or did changes need to be made to the plan of care? Lab results were also reviewed with the patient at the time of each office visit. Medication adjustments or changes were discussed during the clinic visits. If the patient stated he needed a refill on his or her medication the provider was able to order a refill or even a renewal of the patient’s medication electronically which was then mailed to the patient’s home.
Each patient was weighed at each visit and the weight was documented in the patient’s medical record. If it was noted that the patient has gained weight it was discussed with the patient. If the patient was noted to be overweight, a referral to the MOVE program was discussed with the patient. The referral was then electronically submitted prior to the end of the clinic visit by the provider.

If the patient did not understand the appropriate diet for a patient with a diagnosis of DM, a referral was made to the nutritionist if the patient was agreeable. The patient could then meet with the nutritionist via tele-conference in the same clinic where they met with the provider. The provider could also discuss some diet choices during the clinic visit and supply the patient with a wide variety of reading materials and websites to gain more diet information.

For those patients who had an above average number of questions or those who appeared to have a difficult time with some aspects of DM, a referral to the certified diabetes educator (CDE) was offered. If agreeable, the patient could then meet with the CDE via tele-monitor in the same primary clinic in which he met with the primary care provider.

The data collection spanned a time of approximately 12 months. At the end of that time, each patient’s labs were reviewed by the provider. A summary of all the labs were compiled to determine if the HbA1c levels had indeed improved. It was also noted which patients did not present for scheduled appointments. It was documented if any referral recommendations were refused by the patient. It was noted if patients were refilling their medication timely.

The projected costs for the project did include any days that the provider was absent from the primary clinic to travel and meet with IRB or other persons involved at the main facility. It was estimated that the provider would be away from the clinic three business days for a total of $1200. There would be travel costs for the provider ($200). There was printing costs to print the
data for IRB ($50). None of these costs were reimbursed to the provider. There was an estimated 30 minutes per day the provider will spend conducting chart reviews of all the patients in the project. This time was not reimbursed by the employer to the provider.

All of the project data was compiled and a request was made to present the data to the Veterans Health Administration Institutional Review Board (VHA IRB). If permitted to present the data, it will be requested that the information be used by the VHA IRB to determine the need for new treatment guidelines within the VHA. It was the desire of the project coordinator that new policies and procedures be implemented to create standards of care for all patients in the VHA regardless of what provider is assigned as the patient’s primary care provider.

In the event that the provider is not allowed to present the data to VA IRB, it will be distributed via facility email to other providers so that all the providers will be able to evaluate the results and start implementing more frequent clinic visits.

**Data Analysis**

At the beginning of the project, there were 29 patients on the provider’s panel with a HbA1c of 8.9% or greater. Each patient was monitored for a total of 12 months. At the end of the project, only 12 of the original patients had a HbA1c of 8.9% or more. Of the 12 patients with still elevated HbA1c, one decided to see an outside specialist for management of DM. Six patients had multiple episodes of not presenting for lab and primary care appointments. Three of these six did not get their medication refills timely. The remaining five patients stated they did not take their medications as prescribed.

At the beginning of the project, the highest HbA1c level was 14.3%. At the end of the project, the highest noted HbA1c level was 11.8%. Even the HbA1c levels that remained elevated were lower than originally documented.
Project Outcomes

The project was overall a success. Of the 29 patients that had HbA1c over 8.9% at the start of the project, only 12 had not reached HbA1c of 8.9% or lower at the end of one year. Of the twelve, none of them had adhered to their medication regimen and attended all of their appointments. All of the patients who were engaged in their own care saw a significant decrease in the HbA1c levels.

The patients who did not have a decrease were the same patients who missed appointments. Even the patients who did not meet the goal of 8.9% or less saw at least a slight decrease in HbA1c level if they attended all appointments. See Appendix A.

Limitations and Barriers

The largest limitation during this project was subject size. With only 29 subjects at the beginning of the project, it is difficult to know if the results would be similar with a larger study group. A larger group of patients could be utilized in future studies to determine if the results are similar. It is also noted that within the VHA healthcare system there is often not enough providers to care for all of the patients. This could represent a difficulty when scheduling patients to be seen more often. This is why Congress implemented the Choice Program for veterans in 2014. Many veterans are taking advantage of this program and being seen by providers more timely.

Discussions and Implications

If more frequent office visits combined with the interventions that would be performed at the visit can reduce HbA1c to normal or near normal levels, it would decrease the number of
complications related to DM. This practice would also enhance the patient-provider relationship needed to ensure that the highest level of care is given. If only a percentage of our patients with DM and HbA1c level were reduced to normal or near normal there would be a decrease in the amount of money spent on treatment by billions of dollars each year. There would also be a reduction in the number of complications as a result of uncontrolled DM. This practice would also reduce the physical and emotional stress that these patients endure. If the complications were reduced it would, in turn, again reduce the financial cost on the public.

**Recommendations**

Recommendations resulting from this project are that the frequency of office visits for patients with HbA1c levels 8.9% or higher be conducted every three months. An increased visit offers more opportunity for provider-patient face to face interaction. This practice also offers the opportunity to determine why the patient is not compliant to medication management if applicable. During the visit there is also the time to discuss lab results, exercise level, diet, and weight. It is also a perfect time to make referrals to other disciplines. The more collaboration between disciplines concerning patient care, the better the outcomes.
References


Appendix A

Hemoglobin A1c Levels for Patients Who Remained Elevated

<table>
<thead>
<tr>
<th>Patient</th>
<th>Beginning A1c Level %</th>
<th>2nd A1c Level %</th>
<th>3rd A1c Level %</th>
<th>Final A1c Level %</th>
<th>End Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient 1</td>
<td>11.9</td>
<td>Did not Present</td>
<td>14.3</td>
<td>11.8</td>
<td>-0.1</td>
</tr>
<tr>
<td>Patient 2</td>
<td>13.8</td>
<td>12.9</td>
<td>13.2</td>
<td>11.7</td>
<td>-2.1</td>
</tr>
<tr>
<td>Patient 3</td>
<td>9.3</td>
<td>8.1</td>
<td>Did not Present</td>
<td>11.3</td>
<td>2</td>
</tr>
<tr>
<td>Patient 4</td>
<td>10.4</td>
<td>Did not Present</td>
<td>11.3</td>
<td>10.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Patient 5</td>
<td>9.7</td>
<td>7.8</td>
<td>Did not Present</td>
<td>11.1</td>
<td>1.4</td>
</tr>
<tr>
<td>Patient 6</td>
<td>12.3</td>
<td>12</td>
<td>10.8</td>
<td>10.5</td>
<td>-1.8</td>
</tr>
<tr>
<td>Patient 7</td>
<td>9.6</td>
<td>9.3</td>
<td>Did not Present</td>
<td>10.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Patient 8</td>
<td>10.6</td>
<td>8.1</td>
<td>Did not Present</td>
<td>11.3</td>
<td>0.7</td>
</tr>
<tr>
<td>Patient 9</td>
<td>9.0</td>
<td>8.9</td>
<td>Did not Present</td>
<td>9.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Patient 10</td>
<td>9.8</td>
<td>Did not Present</td>
<td>10.3</td>
<td>9.5</td>
<td>-0.3</td>
</tr>
<tr>
<td>Patient 11</td>
<td>9.2</td>
<td>8.3</td>
<td>Did not Present</td>
<td>9.2</td>
<td>0</td>
</tr>
<tr>
<td>Patient 12</td>
<td>13.8</td>
<td>11</td>
<td>Did not Present</td>
<td>11.7</td>
<td>-2.1</td>
</tr>
</tbody>
</table>
June 17, 2016

Carey McCarter, DNP
Mississippi University for Women
College of Nursing and Speech-Language Pathology
MUW-910
Columbus, Mississippi 39701-5800

Dear Dr. McCarter:

I am pleased to inform you that the members of the Institutional Review Board (IRB) have reviewed the following proposed research and have approved it as submitted:

- **Name of Study:** Utilizing Evidence Based Practice to Reduce Hemoglobin A1c Levels in Primary Care by Increasing Frequency of Follow Up Visits

- **Investigator(s):** Mary Smith-Williams

- **Research Faculty/Advisor:** Carey McCarter

I wish you much success in your research.

Sincerely,

Martin L. Hatton, Ph.D.
Associate Vice President for Academic Affairs
MLH/jh

pc: Tammie McCoy, Institutional Review Board Chairman
Appendix C

Search Strategy Map

Search Terms Used .....................................................................................................................Articles Found

Diabetes............................................................................................................................................228.287

Diabetes and Hemoglobin A1c .........................................................................................................5536

Diabetes and Hemoglobin A1c and Primary Care .........................................................................346

Diabetes and Hemoglobin A1c and Primary Care and Complications ...........................................56

Articles Retained.............................................................................................................................08