

Increasing Ophthalmology Referrals for Early Detection of Diabetic Retinopathy

by

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Dedication

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Abstract

Diabetes mellitus currently afflicts 1 out of every 10 residents of North Carolina (North Carolina Department of Health and Human Services, 2016). Diabetic retinopathy (DR) is a distinct vascular complication of diabetes mellitus. Evidence reinforced the need for regular screenings to detect this condition in patients with diabetes mellitus because its initial stages are asymptomatic (American Diabetes Association, 2018). A Doctor of Nursing Practice (DNP) quality improvement (QI) project was implemented in a primary care clinic in rural North Carolina in an effort to increase the number of provider-given ophthalmology referrals to their patients with diabetes mellitus. Primary care providers and their clinical staff were educated on the use of the evidence-based teach-back method of providing patient instructions to increase awareness of the vision threatening complications of diabetes mellitus and the importance of yearly dilated eye exam screenings. The QI project was implemented over 8-weeks, with the DNP student project leader making weekly visits to the clinic to gather data and evaluate progress. Progress was evaluated using the Plan, Do, Study, Act (PDSA) Rapid Cycle of Improvement. A total of 178 charts were reviewed to evaluate the number of ophthalmology referrals given to patients with a diagnosis of diabetes mellitus. Results suggest that using the teach-back method to provide patient education assisted in prompting providers to give ophthalmology referrals when compared to referral occurrences prior to the use of the teach-back method of patient instruction.

Keywords: diabetes mellitus, diabetic retinopathy, ophthalmology referrals, quality improvement, dilated eye exam screenings, teach-back method of patient instructions

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Chapter One: Overview of the Problem of Interest

Diabetic retinopathy (DR) is a distinct vascular complication of diabetes mellitus.

Evidence reinforced the need for regular screenings to detect this condition in patients with diabetes mellitus because its initial stages are asymptomatic (American Diabetes Association, 2018). There are current recommended guidelines for regular screening of patients with diabetes mellitus, despite few persons receiving care required to prevent DR vision loss (Beaser, Turell, & Howson, 2018). Several fundamental obstacles have been reported as reasons for poor vision loss prevention. Hatef, Vanderver, Fagan, Albert, & Alexander (2015) concluded that screenings and follow up with ophthalmology is an important part of diabetes mellitus management and provider engagement with high risk populations increases eye examination rate. Fathy, Patel, Sternberg, & Kohanim (2016) found decreased patient understanding resulted from inadequate health literacy. Konstantinidis et al. (2017) found that primary practitioners did not recommend screenings, and Silva et al. (2016) reports inadequate numbers of ophthalmology referrals by primary providers.

This paper describes a Doctor of Nursing Practice (DNP) scholarly quality improvement (QI) project conducted in a small primary care clinic in North Carolina (NC) aimed to increase ophthalmology referrals given to patients with diabetes mellitus. This QI project will implement the use of a practice protocol to enhance education, understanding, and adherence with American Diabetes Association's (ADA) recommended annual eye examinations among their patients with diabetes mellitus. The purpose of this QI project is to determine if a new protocol, developed by the DNP student project leader, will increase the number of ophthalmology referrals given by the providers to patients with diabetes mellitus.

Background Information

Diabetes mellitus is a chronic systemic condition that causes the body to sustain elevated blood glucose levels. Chronically elevated glucose levels affect many organs and tissues within the body including kidneys, heart, peripheral nervous system, and retinas in the eyes (Robert, 2015). Preventative care services that include screenings for cancer, eye disorders, neuropathy of the feet, and dental complications are current standards of care for patients with diabetes mellitus (American Diabetes Association, 2017). DR is the most regularly occurring complication of the eyes among patients with diabetes mellitus (Jenkins et al., 2015). Diabetic risk factors that raise the chances of DR include: duration of diabetes mellitus, poorly controlled blood sugar levels, and poorly controlled hypertension (American Diabetes Association, 2013).

Diabetic retinopathy. Fathy et al. (2016) wrote that DR is the leading source of new-onset blindness in the United States (U.S.). Reports indicate 28.5% of Americans diagnosed with diabetes mellitus aged 40 years and older have DR (American Academy of Ophthalmology, 2017). DR causes retinal ischemia characterized by microaneurysms, hemorrhages, and abnormalities in retinal microvasculature observed on eye exams (Jimenez-Baez, Marquez-Gonzalez, Barcenas-Contreras, Morales-Montoya, & Espinosa-Garcia, 2015). Retinal hemorrhages cause significant vision loss (Jimenez-Baez et al., 2015). Estimated prevalence of DR in the U.S. year 2020 is 6 million people, of which 1.34 million will be diagnosed with Vision Threatening Diabetic Retinopathy (VTDR) (American Academy of Ophthalmology, 2017).

Ophthalmologists are qualified to diagnose and grade DR in patients with diabetes mellitus (Zaki et al., 2016). Scanlon, Aldington, & Stratton (2014) reported that patients who

were not screened for DR promptly after diagnosis of Type 2 diabetes mellitus had increased rate of DR detection in later years. Early screenings and diagnosis are essential for appropriate treatment; the early stages of DR are usually asymptomatic which makes ophthalmology referrals crucial (Skaggs, Zhang, Olson, Garg, & Davis, 2017). Because the early stages of this disease are asymptomatic, patient's need to learn about risks. Therefore, screenings need to become a priority in their healthcare.

DR is associated with poorer quality of life in patients with diabetes mellitus. Leisure, work, travel, physical abilities, family and social life, emotional and sexual relationships, self-confidence, finances, the patients' future, dependence, and motivation are adversely affected (Alcubierre et al., 2014). Blindness caused by diabetes mellitus accounts for five-hundred million dollars in lost wages annually (Fathy et al., 2016). Screening for diabetic eye diseases is a cost effective medical intervention, which saves the federal government an estimated \$62 million - \$109 million annually (Schoenfeld, Greene, Wu, & Leske, 2001). Skaggs et al. reported that the effort to increase diabetic eye exam compliance should harmonize with primary care providers' efforts to improve their patients' awareness about DR (2017). Studies indicate that providers need to educate their patients with diabetes mellitus about diabetes mellitus complications and the importance of eye exams and possible treatments for DR to increase patient adherence with annual eye exams (Khan & Sadiqulla, 2014).

Health literacy in diabetes management. Health literacy is defined as how well an individual can obtain necessary health information and services, and how well they understand that information to make good health decisions (U.S. National Library of Medicine, 2018). People with diabetes mellitus require skill sets, Nielsen-Bohlman & The Institute of Medicine (2004) concludes adequate health literacy to help them make appropriate decisions and use

healthcare systems to successfully manage their illness. However, a landmark report issued from the U.S. Department of Health and Human Services indicated that only 12% of U.S. adults were proficient in health literacy (U.S. Department of Health and Human Services, 2008). Low health literacy contributes to poor health outcomes. Low health literacy affects patients' access to quality health care and has been linked to decreased patient safety (Hersh et al., 2015).

Therefore, it is essential that providers be certain that their patients understand diabetes mellitus sufficiently to appropriately make decisions about annual eye exams and overall care.

Many patients, with limited health literacy, rely on their primary providers to explain severity of their illnesses and importance of preventative care needed (Fathy et al., 2016). Bressler et al. concluded that only 44.7% of patients diagnosed with diabetic macular edema reported they were informed that diabetes mellitus could cause vision loss (2014). Thus, patient teaching is an important part of patients' plan of care. However, Nielsen-Bohlman & The Institute of Medicine (2004) suggest that patients are reluctant to admit that they do not understand the information their providers gave them. According to Milani & Lavie (2015), a team-based approach to healthcare is an ideal way to manage 21st centuries chronic disease crisis. Nurses and ancillary staff are expected to deliver this healthcare gold standard to their patients.

Significance of Clinical Problem

Currently, 1 out of every 10 North Carolina residents are afflicted by diabetes mellitus (North Carolina Department of Health and Human Services, 2016). DR is the most common cause of blindness in North Carolina to date (Skaggs et al., 2017). Current guidelines recommend patients with diabetes mellitus should receive a dilated retinal eye exam performed by an ophthalmologist on diagnosis and at least annually with a basic fundusoscopic examination

by the primary care provider at every diabetes mellitus related visit to the clinic (American Diabetes Association, 2018). However, over 50% of patients with diabetes mellitus do not receive these necessary screenings (American Diabetes Association, 2018). DR is a dangerous condition that is easily ignored because it is asymptomatic in its early stages of development (Skaggs et al., 2017). Therefore, annual eye screenings are imperative to prevent vision loss among diabetics.

Question Guiding Inquiry (PICO)

The purpose of this QI project is to evaluate if using a teach-back protocol for the staff of a primary care clinic in North Carolina to deliver patient instructions, will increase the number of ophthalmology referrals provided for patients with diabetes mellitus.

Population. Targeted population will be adult patients with type I and type II diabetes mellitus seen in a primary care clinic during the project implementation, who do not receive annual eye exams at present.

Intervention. The intervention involves the use of a new teach-back protocol to be used by clinic staff (providers, nurses, CNAs) when instructing patients about the risks and management of diabetes mellitus. Use of this protocol is expected to increase awareness in patients with diabetes mellitus and their willingness to obtain eye exams. Increased patient awareness will result in provider opportunity to make ophthalmology referrals for any at risk patients.

Comparison. Comparison will be the number of ophthalmology referrals made for patients with diabetes mellitus before the project, compared to the number of ophthalmology referrals made for patients at project completion.

Outcome(s). Two anticipated project outcomes are to implement a teach-back protocol for the staff at a NC primary clinic to use that increases ophthalmology referral appointments made for patients with diabetes mellitus. The other anticipated outcome for this project is to increase the number of ophthalmology referrals made for patients with diabetes mellitus by the clinic providers by at least 25% by end of project implementation semester.

Summary

Primary care management of chronic illnesses such as diabetes mellitus is essential. With diabetes mellitus affecting many Americans, rates of diabetic related eye diseases are likely to increase. Therefore, all members of the health care team need to be certain that patients obtain necessary information to manage their diseases to maintain their best quality of life. The purpose of this project is to improve healthcare practice by ensuring providers are educating patients with diabetes mellitus and referring them for eye screenings. Eye exam referral results in better patient health outcomes and better patient centered clinical care.

This chapter briefly reviews diabetes mellitus, diabetic retinopathy, importance of patient education adherence and the framework for this quality improvement project. This chapter also explains how DR has clinical significance to healthcare and how implementation of an evidence-based teaching tool may help to improve DR screening exams. Much evidence support rationale for this quality improvement project. Evidence exist to solve the problem of non-adherence among diabetic recommended DR screenings.

Chapter Two: Review of the Literature

Identification of appropriate literature to support a project involves in-depth search of evidence-based articles on different electronic databases pertinent to the problem of interest (as well as practical solutions to that problem). This chapter outlines the process of conducted searches and how studies were chosen for this Doctor of Nursing (DNP) scholarly quality improvement (QI) project. It will explain inclusion and exclusion criteria for articles found during review.

Methodology

An extensive literature review was conducted to locate scholarly articles that included topics related to the intended quality improvement project. One of the topics that guided the search method included current diabetic guidelines for eye screenings and diabetic retinopathy, with emphasis on barriers that prevent patients from receiving screenings. Another topic included the role of primary providers in managing chronic illnesses. The literature searches used for this quality improvement project used electronic databases provided to the students enrolled at East Carolina University (ECU) through the college website.

Databases

The databases used for this project included PubMed, CINAHL (EBSCOhost), and ECU's Laupus Library (One Search). Individual searches were conducted from professional organizational websites and internet webpages to identify current evidence-based guidelines and information pertinent to diabetic retinopathy that included; the Center for Disease Control (CDC), the American Diabetes Association (ADA), Healthy People 2020, the American Academy of Ophthalmology, and the North Carolina Department of Health and Human Services (NCDHHS).

Sampling strategies. The strategies for the literature search included using keywords and phrases such as: "diabetic (and) eye exams", "diabetic retinopathy", "diabetic eye exam guidelines", "primary care goals to managing chronic illness", "advantages of ophthalmology referrals", "health literacy", "teach-back method of patient education", "integrated theory of health behavior change", and "PDSA model". A total of 417 articles were found from this search criteria.

Search limitations on the PubMed database included: full text availability, human subjects, English language, systematic reviews, nursing journals, and adult: 19+ years in age. Search limitations on the Laupus Library One Search included: full text online, scholarly and peer reviews, nursing discipline, advanced practice nursing subjects, quality improvement subjects, and evidence-based practice subjects.

Evaluation criteria. Articles were chosen for further review based on whether the titles were related to the project. After choosing articles based on the title, abstracts were reviewed for relevance to the intended project. The final articles about diabetes mellitus and diabetic retinopathy (DR) were chosen if: They were about DR prevention, patient adherence, or if they were about the role of providers in managing chronic illness. Articles were chosen if they were studies about the teach-back method of patient education. Other articles were chosen based on relevance to the theoretical framework and evidence-based concepts used for this project. After review, a total of 43 studies chosen are relevant to the problem of interest. (See Appendix B for Evidence Matrix review of Literature).

Literature Review Findings

The literature search for this QI project provided important information to the author regarding patients with diabetes mellitus and the factors that contribute to the compliance or non-

compliance of these patients getting recommended annual eye exam screenings. There were, however, two topics mentioned more than others; patients' lack of adequate awareness/knowledge/education about diabetic complications associated and significance of prompt ophthalmology referrals by primary providers.

Diabetic patients' lack of adequate awareness/knowledge. Numerous studies reported that lack of adequate awareness, knowledge and education contribute to patients with diabetes mellitus non-adherence to DR screenings. A comprehensive review by C. Fathy et al. (2016) concluded that a patient's lack of knowledge and understanding of diabetes mellitus and its progression led to patients with diabetes mellitus non-adherence in recommended health screenings. A randomized control study by Basch, Walker, Howard, Shamon, & Zybert (1999) provided intensive education on the importance of eye screenings in diabetics increased follow-up appointment rates by 54%. A cross-sectional analysis by Konstantinidis et al. (2017) stated that results of that study proved adequate diabetic eye examination rates correlated positively with increased patient awareness. Srinivasan et al. (2017) reported their study found a patient's adequate knowledge about their disease showed a significant association with positive health practice patterns. The decision to implement the evidence based teach-back method of patient instructions was chosen by the author of this project and was agreed on by the project site staff.

Timely ophthalmology referrals by providers. The literature search revealed another barrier to compliance of diabetic patients to get recommended eye screenings is inadequate timeliness of primary providers giving ophthalmology referrals to these patients. Silva et al. (2016) reviewed the charts of 1,250 diabetic patients that were 18 years old or older in a comprehensive review study in endocrinology and primary care offices at the Cleveland Clinic over 12 months. The researchers stressed the importance of early identification of DR to avoid

vision loss in patients with diabetes mellitus (Silva et al, 2016). This study found that many patients were not being promptly referred for comprehensive retinal exams, leading to missed opportunities to prevent vision threatening diabetic retinopathy (VTDR) (Silva et al., 2016). Keel et al. (2017) determined the referral rate prevalence of vision impairment with chronic eye diseases. The study had a total of 4836 individuals that were aged 40-98 years (Keel et al., 2017). Of the total, 18.0% needed prompt ophthalmology referrals due to diabetic retinopathy findings (Keel et al., 2017). 19.9% needed prompt referrals due to non-adherence to diabetic ocular examinations (Keel et al., 2017). Keel et al. (2017) noted that most eye care protocols used in primary care offices do not include referral guidelines, which leaves their patients with improper management of diabetes mellitus related eye diseases.

Limitations of Literature Review Process

Limitations of the literature review included few studies on the teach-back method used with diabetes mellitus or DR. Most of the literature about this project's theoretical framework was published over five years ago. There were no articles found on the theoretical framework and patients with diabetes mellitus or DR exclusively. There were few studies on diabetic eye exams managed by primary care providers alone.

Discussion

Multiple articles found on diabetic eye exam screenings and barriers to patient/provider compliance were found. Review of the literature on DR and its prevention was very beneficial to the decision chosen for project implementation. Evidence-based practice change is essential to providing quality healthcare.

Conclusion of findings. After reviewing the literature on diabetes mellitus, DR, and management of these conditions, the DNP student project leader decided to implement a protocol for clinic staff to help provide education for patients with diabetes mellitus. Protocol will increase awareness and knowledge on eye complications associated with diabetes mellitus. Increased knowledge will be done by using the teach-back method for patient education at every visit. This protocol includes a requirement that clinic providers provide overdue ophthalmology referrals for patients with diabetes mellitus to stress the importance of annual eye examinations. The clinic's staff for this project agreed to implement this protocol to aid in increasing the number of ophthalmology referrals provided to their diabetic population.

Advantages and disadvantages of findings. Cumulative findings indicate reasons that some interventions work, and others do not. The following content describes advantages of specific interventions.

Teach-back advantages. The teach-back method is an evidence-based quality improvement tool that is simple and powerful, ensures effective staff communication and validation of patient understanding (Caplin & Saunders, 2015). The teach-back method is endorsed by organizations such as the Agency for Healthcare Quality and Research, The Joint Commission, and the Institute for Healthcare Improvement for engaging patients and their families in learning health maintenance (Caplin & Saunders, 2015). In this method the patient describes in their own words, what they learned from the provided information. This allows the team to assess a patient's understanding and to clarify any misunderstanding of the information (Caplin & Saunders, 2015). Studies show that the patients prefer this method because it creates an opportunity to ask questions, discuss concerns, and seek clarification, making them feel more in charge of their health (Miller, Lattanzio, & Cohen, 2016).

Ophthalmology referral advantages. Advantages to providing ophthalmology referrals for patients with diabetes mellitus are that referrals are important because they ensure continuous care for the patient (Senitan, Alhaiti, & Lenon, 2018). The ADA recommends ophthalmology referrals to obtain initial and follow up dilated retinal eye exams for adequate management of diabetic care (American Diabetes Association, 2017). Timely ophthalmology referrals for patients with diabetes mellitus decrease the rate of vision loss in this population (Silva et al., 2016). Furthermore, dilated retinal exams result in a sensitivity and specificity of 75% to 100%, compared to fundus exams of 38% to 100% (Kopplin & Mansberger, 2015).

Teach-back disadvantages. Disadvantages to the teach-back method include required staff education on its purpose and how to appropriately incorporate this into daily practice (Griffey et al., 2015). An increase in the amount of time is also needed by the provider with each patient to provide this level of instruction. Research studies report longer time spent educating patients with the teach-back method equals more accurate patient understanding and retention of information (White, Garbez, Carroll, Brinker, & Howie-Esquivel, 2013).

Ophthalmology referral disadvantages. The main disadvantages about ophthalmology referrals is that current studies report a time lapse between (diabetes mellitus) diagnosis and eye exam referral is 3.1 years (Scanlon et al., 2014). Current guidelines recommend that patients with diabetes mellitus should be referred for eye exam at the time of diagnosis (Scanlon et al., 2014). There is also inconsistent communication from the ophthalmologists with reporting the patients' first eye exam reports back to the primary providers (Papa, Fenwick, Rees, Lamoureux, & Finger, 2016).

Utilization of findings in practice. An agreement was made between the DNP student project leader planning the project and the site champion of the project site to schedule meetings

with the clinic staff for training sessions on the teach-back method before project implementation. The teach-back method will be used by any clinic staff that gives direct information to the patients with diabetes mellitus about annual eye exam recommendations and the importance of them. Providers will also provide ophthalmology referrals for these patients to help with encouraging the patient to obtain the screening and to continue adequate management of care with interprofessional collaboration. The DNP student project leader will evaluate the effectiveness of the teach-back method by measuring the number of ophthalmology referrals provided to patients that agree to obtain an eye exam.

Summary

Literature searches on DR and ophthalmology referrals provided useful information with the project planning, as well as, being able to move forward with the implementation of the quality improvement project discussed. Review of the literature gave clear information on the importance of annual dilated eye examinations for patients with diabetes mellitus. Clear information to implement a protocol that improves healthcare practice for patients with chronic diseases characterizes this quality improvement project. Increasing patient awareness about diabetes mellitus and its risks and providing patients with ophthalmology referrals will increase annual eye exam compliance.

Chapter Three: Theory and Concept Model for Evidence-based Practice

Theory based healthcare enhances achievement of positive health outcomes and helps explain an individual's response to treatment of chronic illnesses (Ryan, 2009). Theory is used in nursing to guide the way a person practices and provides a way to view phenomena in an orderly way (Moran, Burson, & Conrad, 2017). This chapter provides an overview of the concepts, theoretical framework, and the evidence-based change model that guided the development of this Doctor of Nursing Practice (DNP) scholarly quality improvement (QI) project.

Concept Analysis

Diabetes mellitus. Diabetes mellitus is defined as a chronic condition characterized by relative lack of insulin, hyperglycemia, dyslipidemia, and neurovascular damage (Jenkins et al., 2015). For the purpose of this QI project, the DNP student project leader chose a population that included patients with both type I and type II diabetes mellitus, aged ≥ 18 years. Chronically elevated levels of glucose adversely affect different organs and tissues within a patient's body (Frank, 2015). The effect on the eyes resulting in diabetic retinopathy is one of the most common complications found in patients with both type I and type II diabetes mellitus (Jenkins et al., 2015).

Ophthalmology referrals. Annual diabetic eye examinations and prompt treatment are the keys to controlling diabetic retinopathy (DR) causing vision loss (Hatef et al., 2015). For the purpose of this QI project, the DNP student project leader chose to educate clinic providers and staff about the American Diabetes Associations (ADA) recommendations for diabetic eye exams. The ADA recommends a dilated and comprehensive eye examination by an ophthalmologist at least annually for every patient with type I or type II diabetes mellitus (American Diabetes Association, 2017). Patients with type I diabetes mellitus should receive an initial dilated eye

exam within the first 5 years of diagnosis and annually thereafter (American Diabetes Association, 2017). Patients with type II diabetes mellitus should receive an initial dilated eye exam at diagnosis and then annually (American Diabetes Association, 2017).

Teach-Back Method of patient instruction. Providers caring for patients with diabetes mellitus need to increase patient adherence to annual eye exams, by making sure that they are educating patients about complications and the importance of annual dilated eye exams (Khan & Sadiqulla, 2014). For the purpose of this QI project, the teach-back method of patient instruction was taught to the providers and staff of the clinic to educate patients with diabetes mellitus. The teach-back method assists healthcare professionals to provide patient information in terms they can understand (Tamura-Lis, 2013). Teach-back is an iterative process to provide give information to a patient by asking them to repeat what they understand about provider given information (White, Garbez, Carroll, Brinker, & Howie-Esquivel, 2013). Overall goal of the teach-back method is to effectively teach patients or family at appropriate literacy levels (Tamura-Lis, 2013).

Theoretical Framework

Dr. Polly Ryan's Integrated Theory of Health Behavior Change (ITHBC) is the theoretical framework used to guide this QI project. Dr. Ryan's mid-range theory asserts that a person's health practices can be improved by increasing knowledge and beliefs about their current health, increasing self-regulation abilities, and enhancing their social facilitation and influence (Ryan, 2009) (see Appendix A for ITHBC model illustration). ITHBC has been used to guide study of parental motivation and intention on sun safety practices in children. Findings suggest a strong correlation between the effects of parents' beliefs and behaviors on sun

protection for their children when this theory was the basis of the education (Hamilton, Kirkpatrick, Hagger, & Rebar, 2017).

Ryan developed the ITHBC model by blending concepts from the Theory of Reasoned Action, the Social Cognitive Theory, and the Health Belief Model and assumes behavior change to be dynamic and repetitive (Ryan, 2009). The reason this theory was the selected project framework is because Ryan's theory proposed that social influence from a person of perceived authority (i.e. healthcare providers) can significantly sway a persons' motivation and lead to engagement of the intended behavior (Ryan, 2009). Providers involved in the project could be the social influence that diabetics need to undergo dilated eye examinations. According to Ryan, Maierle, Csuka, Thomson, & Szabo (2013), ITHBC model was used to increase Osteoporosis prevention by increasing engagement in recommended bone health promotion behaviors among women (Ryan, Maierle, Csuka, Thomson, & Szabo, 2013).

Application to practice change. Theory-based practice enhances positive patient outcomes and helps clinicians to be better focused on assessments (Ryan, 2009). Ryan considers healthcare workers as people of social influence to their patients. Ryan's theory assumes that educating patients about the management of their chronic illnesses can change the way a person behaves towards prevention practices that will aid to increase their quality of life. Ryan developed the ITHBC to increase a patient's ability to engage in their own chronic illness management by being more aware of prevention practices with healthcare providers' impact (Ryan, 2009). Any resource that can increase a person's condition-specific knowledge or ease self-care management, should be used consistently in healthcare. The DNP student project leader implemented a teach-back protocol to increase the patients with diabetes mellitus knowledge on the importance of annual dilated eye exams. The protocol also included the

providers giving these patients ophthalmology referrals as a way to make the patient's task of obtaining eye exams a little easier.

Evidence-Based Practice Change Theory

The evidence-based practice (EBP) change theory used for this quality improvement project was the Plan-Do-Study-Act (PDSA) model. The PDSA model, also known as the Deming Wheel, is a systematic process to gain knowledge that improves a product, process, or service (The W. Edwards Deming Institute, 2018). The PDSA model of change is used to improve quality of care by making current healthcare safer, more patient-centered, timely, more efficient, and more effective for the patients involved (Donnelly & Kirk, 2015). The PDSA model tests small areas of change to make a large process work better (Coury et al., 2017).

PDSA Model Steps. There are four steps that make up the PDSA model (see Appendix B for the PDSA Cycle illustration). The first step in the process is the "Plan" step: in which a person implementing a change decides the problems in current process, what the goals to achieve are, and what evidence proves there is an actual problem (Donnelly & Kirk, 2015). The second step is the "Do" step: in which, the planned change is implemented for a specific time frame. Outcomes, problems, unexpected observations, and any changes that occurred are recorded for review (Donnelly & Kirk, 2015). The third step is to "Study" the data recordings that were gathered during the previous steps and decide if the plan worked out as expected and what was learned during the process (Donnelly & Kirk, 2018). The final step of this cycle is to "Act": in which the parties involved must decide on the next step, do they continue with the new change (because it is improving the process) or do they decide to change the process some more to make it even better (Donnelly & Kirk, 2015).

Application to practice change. The PDSA model is a standard quality improvement tool used to start a new program or practice change in a complex environment, i.e. a primary care clinic (Coury et al., 2017). This evidence-based change model is a great resource for healthcare providers because it is commonly used for improvement in healthcare settings and is familiar to clinical staff (Coury et al., 2017). Taylor et al. (2014) wrote that the PDSA model used in healthcare quality improvement reports measurement of data over time helps to understand natural healthcare system's variations, increases awareness of factors that influence processes and outcomes, and helps to understand the overall impact of an intervention. The purpose of this DNP scholarly QI project was to improve practice so that adherence to annual dilated eye exams for patients with diabetes mellitus is increased. Using the PDSA model to begin a way to evaluate QI project outcomes and to act on successes or failures throughout the process change.

Summary

The use of theory and EBP models of change led the project leader to use the teach-back method of patient instruction to increase knowledge among patients with diabetes mellitus at the site clinic. The teach-back method was used along with provider given ophthalmology referrals to make it easier to undergo recommended. Using these methods to improve clinic practice for their patients with diabetes mellitus is an example of how theory and EBP models guide healthcare practice to better patient outcomes.

Chapter Four: Pre-implementation Planning

An identified problem in the primary care clinic where the Doctor of Nursing Practice (DNP) scholarly quality improvement (QI) project was implemented is fewer patients with diabetes mellitus receiving annual eye exams. An intervention, involving a new protocol, brought a change in practice in this clinic to increase the awareness of annual eye examinations in their diabetic population. This chapter describes the planning and intended outcomes for the QI project as described in previous chapters.

Project Purpose

The purpose of this QI project is to implement a two-step practice protocol that will increase the number of ophthalmology referrals are given to patients with diabetes mellitus by providers for annual eye examinations. The first step of this practice protocol was incorporating the teach-back method of patient instruction when informing and instructing patients with diabetes mellitus about the need and importance of annual eye exams. The second step of this practice protocol incorporated the requirement that the providers provide ophthalmology referrals to patients with diabetes mellitus for scheduling the eye examinations.

Project Management

Organizational readiness for change. The primary care clinic chosen for this QI project met with the DNP student project leader and expressed concern about the clinic not meeting expected organizational goals regarding their patients with diabetes mellitus receiving annual dilated eye exams. The decided QI project was based on the needs of this concern specifically. The organization is ready for a positive outcome regarding their patients with diabetes mellitus in specific regard to annual dilated eye exams and conversed to the DNP student project leader that they were willing to try a practice change to make this happen.

Inter-professional collaboration. The project team members that were involved in this QI project included the nursing staff, the referral coordinator, the office manager, the nurse practitioner (who was the project site champion), and two physicians that worked in this clinic. The nursing staff handled evaluating if patients with diabetes mellitus received a dilated eye exam within the past year of the visit date and reporting the information to the provider (nurse practitioner or physician) that would be providing care to the patients. The providers were responsible for using the teach-back method of instruction to educate the diabetic patients on the importance of the annual eye exam and providing the ophthalmology referrals to those patients. The referral coordinator handled completing the referral process and providing the student author with weekly referral reports for data collection. The office manager gave approval for the project to be conducted within this clinic and helped in overseeing the project on a daily basis during the project's conducted time frame.

Risk management assessment. A SWOT analysis was conducted to evaluate each of the tools used during this QI project.

Strengths. The teach-back method of instruction is an evidence-based tool that has proven successful of ensuring adequate patient understanding of information (Caplin & Saunders, 2015). Teach-back is endorsed by the Agency for Healthcare Quality and Research, The Joint Commission, and the Institute for Healthcare Improvement (Caplin & Saunders, 2015). The American Diabetes Association (ADA) recommends ophthalmology referrals for adequate management of diabetic care (American Diabetes Association, 2017). Combining the use of these two successful tools was supported by the clinic site to use in the implementation of a new practice change protocol for the purposes of this project.

Weaknesses. Using the teach-back method requires additional time for staff education on how to appropriately incorporate this into daily practice (Griffey et al., 2015). There is also an increase for provider time needed with patients to provide this level of instruction. One of the main weaknesses with ophthalmology referrals is a time lapse of 3.1 years between (diabetes mellitus) diagnosis and eye exam referral, the recommended exam time after diagnosis with within the first year (Scanlon et al., 2014).

Opportunities. The teach-back method allows the team to assess a patient's understanding and to clarify any misunderstanding of the information (Caplin & Saunders, 2015). Studies indicate that the teach-back method is preferred by patients because it creates an opportunity to ask questions, discuss concerns, and seek clarification, making them feel more in charge of their health (Miller, Lattanzio, & Cohen, 2016). Providing ophthalmology referrals to patients with diabetes mellitus ensures a continuum of care for the patients, as well as, provides adequate collaboration between the provider and ophthalmologist (Senitan, Alhaiti, & Lenon, 2018).

Threats. Low health literacy is a one of the threats that presents itself with the teach-back method. Low health literacy can contribute to decreased patient safety and poor health outcomes (Hersh et al., 2015). The U.S. Department of Health and Human Services indicated that only 12% of U.S. adults were proficient in health literacy, this could potentially limit how successful the teach-back method of instructions could be (U.S. Department of Health and Human Services, 2008). There can sometimes be inconsistent communication from the ophthalmologists with reporting the patients' eye exam reports back to the primary providers, leaving a gap in required information for the primary providers that are managing the care (Papa, Fenwick, Rees, Lamoureux, & Finger, 2016).

Organizational approval process. The DNP student project leader and project clinic nurse practitioner held several discussions. These discussions concluded that assistance was needed to increase the number of annual eye exams for their patients with diabetes mellitus. Several meetings were completed to decide on the practice change that would need to take place that could possibly influence an increase in exams. The practice change protocol for this project was developed by the DNP student project leader, presented to the clinic's nurse practitioner and physician, and an agreement was made for this project.

Information technology. The organization's electronic medical record (EMR) charting system was the technology used to gather data for this QI project. Documentation of every time that the "teach-back" method was used to provide information to patients with diabetes mellitus was entered into the EMR. This data was pulled from the EMR weekly for measurements throughout the course of the project. The EMR was also used for the clinic's referral coordinator to document each time an ophthalmology referral was given to patients with diabetes mellitus. Each week the DNP student project leader visited the clinic and accessed the EMR to obtain the number of ophthalmology referrals that were provided the week before for data measurements during the project's implementation course.

Cost Analysis of Materials Needed for Project

The total cost of this QI project was approximately \$416.89. Money was spent on materials needed to print handouts used to educate the staff on the new practice change protocol, as well as, the audit tools used to gather data throughout the projects course. These costs included two packs of printer paper, at around \$9.99/pack and the purchase of two cartridges of printer ink at around \$19.99 each. With a current 7% sales tax in North Carolina, the total costs for these supplies were \$64.16 (City of Concord, 2017).

The DNP student project leader included costs for mileage that was traveled to and from the clinic for the purpose of project implementation. This included a totaled sixteen, 32-mile round trips to and from the clinic, these were for the purpose of staff education and instruction on the project and weekly trips to collect data. The standard mileage rate for North Carolina currently, according to the Internal Revenue Service (IRS) (2017), is at 54.5 cents/mile. Rounded up to \$0.55/mile, this equaled a total mileage costs of \$281.60.

The DNP student project leader provided doughnuts and juice to the staff during the initial educational visits, so this cost was included as well. Two dozen doughnuts, one gallon of orange juice, and a large box of hot coffee was provided to the staff on each of the two days used for clinic staff educational sessions. The approximate costs of these items, including sales tax, was \$71.13.

Plans for Institutional Review Board Approval

Once the project was agreed on between the DNP student project leader and the clinic, the DNP student project leader had to present the QI project to the healthcare organization's Institutional Review Board (IRB), as well as, East Carolina University's (ECU) IRB for approval to proceed. The process for approval from both the organization's and the university's IRBs were conducted in July 2018. Information regarding the QI project's purpose, materials used to educate the staff on the protocol that was implemented, plans for gathering data throughout the project implementation, and letter of organizational approval from the clinic was provided to both of the IRBs for review. A waiver was received from the IRB at the healthcare organization on July 20, 2018 and a waiver was received from the IRB at ECU on July 25, 2018 by the DNP student project leader.

Plan for Project Evaluation

Demographics. The demographic data that will be collected for this QI project includes age, sex, and date of last annual eye examination (if available). For the purpose of this project, age will be reported as a mean within an age range of 21 years old (youngest recorded patient) - 93 years old (oldest recorded patient) and the sex of the patients will only be used for data analysis pertaining to comparison between male and female patients and the referrals given. The information regarding the date of last eye exams will only be used as a possible indication of why a referral was not provided to that particular patient.

Outcome measurement 1. One of the intended outcomes for this QI project was to implement a teach-back protocol for the staff at the clinic to use with the patients with diabetes mellitus. This teach-back protocol was aimed at providing a way for the staff to increase the patient's awareness of vision-related complications of diabetes mellitus and to explain the importance of yearly dilated eye screenings. The long-term goal of using the teach-back method with the patients with diabetes mellitus, is to increase their overall adherence with the recommended annual dilated eye exam screenings.

Evaluation tool. To evaluate the teach-back protocol, the clinic staff will be instructed to document each time the teach-back method is used to inform or educate a patient in that patient's EMR. This information will also be recorded on an audit tool designed by the project leader of this project for weekly data collection (see appendix C for sample of the audit tool).

Data analysis. The DNP student project leader of this project will make weekly trips to the clinic throughout the project time frame to collect data regarding the teach-back methods use with patients with diabetes mellitus. Audit tool collections and EMR evaluation was done by the project leader for analysis of the weekly use of the teach-back method of instruction.

Outcome measurement 2. The DNP student project leader obtained data on the number of ophthalmology referrals given to patients with diabetes mellitus in the project clinic over an 8-week period prior to the project implementation. The pre-project number of ophthalmology referrals provided in this clinic over an 8-week period prior to the project start was a total of 41. The other intended outcome of this QI project is to increase this total number of 41 ophthalmology referrals given by the providers in this clinic to patients with diabetes mellitus by at least 25% by the end of the 8-week project semester. If accomplished, this will increase the 8-week number of ophthalmology referrals given of 41 to at least 51.25 referrals provided. The purpose of this outcome is based on the assumption that by providing ophthalmology referrals to patients with diabetes mellitus at the time of the office visit, the patient will be more likely to keep the scheduled appointment with the ophthalmologist for eye exams. This outcome is intended to make the process of finding an ophthalmologist and scheduling an appointment easier for the patients. It also encourages the providers to be more involved in the collaboration of the patient's care with other specialties developing a continuum of care for each patient.

Evaluation tool. The audit tool created by the DNP student project leader will also be used to record each ophthalmology referral provided to patients with diabetes mellitus during the project (see appendix C for audit tool). The clinic's referral coordinator will also document each ophthalmology referral that given to the patients in the EMR throughout the project's implementation timeframe.

Data analysis. During the week of staff education sessions, the DNP student project leader will collect data from the referral coordinator to obtain information on the total number of ophthalmology referrals that the clinic provided to their patients during the 8-week period prior to the start of the QI project. After project implementation, data provided by the referral

coordinator along with completed audit tools will be collected by the DNP student project leader regarding the total number of ophthalmology referrals provided each week throughout the project course. The collected data will be used to analyze weekly progress. At project completion, the data collected will also be used to evaluate if the number of ophthalmology referrals provided increased by at least the 25% goal.

Data management. The data collected weekly from the provided audit tool and clinic referral coordinator will be entered into the DNP student project leader's saved Microsoft Excel application for a running measurement of information and number analysis throughout the project course. Once the information is entered into Excel, the hard copies of the information will be placed in the shred bins at the clinic to be destroyed. There will not be any identifiable patient markers obtained during the data collection process.

Summary

The pre-implementation planning for this DNP scholarly QI project was completed by the DNP student project leader, with assistance from the clinical site champion, the student's faculty project lead, as well as, the additional ECU DNP course instructors. Identifying a problem of interest for the clinical site was the first step in the development and planning for the DNP scholarly QI project. Waivers from the clinic's institutional IRB and ECU's IRB were obtained to be able to proceed with implementation of the DNP scholarly QI project within the chosen primary care clinic.

Chapter Five: Implementation Process

This chapter will explain the process of implementation of the Doctor of Nursing Practice (DNP) scholarly quality improvement (QI) project within the clinic. Detailed explanations of the project setting, participants involved, any recruitment that was involved in the project process, the steps of the initial implementation, and any variations in the expected outcomes will be provided within this chapter.

Setting

The setting for this QI project took place in a small primary care clinic, with a provider estimated 8,000 patients seen annually (Project site champion/Family Nurse Practitioner [FNP], personal communication, June 12, 2018). Located in North Carolina's (NC) piedmont region, this clinic is part of a much larger healthcare system that covers most of the southern part of NC, South Carolina, and Georgia. The clinic itself is located in a very small rural town, most of the population are older adults with limited income. Medicaid and Medicare are the main insurance sources that make up the clinic's patient population. According to the project site champion, the Nurse Practitioner providing care in this clinic, the majority of the patient's that are cared for in this clinic have lower levels of health literacy (Project site champion/FNP, personal communication, June 12, 2018). Lower health literacy levels are why the evidence-based methods of teach-back and ophthalmology referrals were the chosen instruments used with the new practice change protocol implemented for this project.

Patient Population

Weekly chart audits will be done to collect data for information on the number of referrals given to patients with diabetes mellitus throughout the entire 8-week project. The charts that will be reviewed will include the charts of any new or established patients within

this clinic that have a diagnosis of type I or type II diabetes mellitus. The diabetes mellitus diagnosis could be an ongoing condition or newly diagnosed. The participants must be at least 18 years old to be considered eligible for use in this project.

Participants were excluded if they were younger than 18 years old, this is because children were not considered as a part of this project due to the fact that they were not solely responsible for their own health maintenance. If participants needed ophthalmology referrals but did not have a diabetes mellitus diagnosis, then they were not considered for this project. Participants were also excluded if they had a diagnosis of “pre-diabetes” or “hypoglycemia”.

Recruitment

There was no actual recruitment for this QI project. The participants were screened for the inclusion/exclusion criteria by the clinic staff on the day of their scheduled appointments.

Implementation Process

The implementation of the DNP scholarly QI project was a process that spanned over an 8-week period, starting September 5, 2018 and lasting until November 9, 2018. The implementation started with three educational sessions provided by the DNP student project leader to the primary care clinic staff about the background and purpose of the QI project, the practice change protocol that will be used, and specific instruction on the use of the teach-back method of patient instruction and when to provide ophthalmology referrals for the purpose of the project. These sessions took place on September 5th, 6th, and 7th, 2018, which was the first week of the project period.

Once the practice change protocol started, on September 10, 2018, the site champion of the project assisted the DNP student project leader with the implementation of the new

protocol. By assuring that the protocol was being used appropriately and assisting with any concerns, the DNP student project leader was available to assist the site champion by phone or in person if needed to answer any questions and address concerns that arose about the protocol and how it was being used. Each time the teach-back method was used to educate or instruct patients with diabetes mellitus about the importance of annual eye exams, it was documented in the electronic medical record (EMR) by the staff. This was also done with each ophthalmology referral that was provided. The DNP student project leader returned to the clinic weekly to conduct chart reviews using the EMR records and referral reports for data collection. This data was recorded weekly in Excel for purposes of data measurement at the conclusion of the project.

Plan Variation

During the initial project educational sessions for the clinic staff, the decision was made for the DNP student project leader to take over the task of filling out the audit tool at the weekly office visits for data collection. The providers within the clinic voiced concerns over having the time during their busy work days to document when they used the teach-back method and if a referral was given in the patients' EMR as well as on the provided audit tool. The providers reported to the DNP student project leader that this was too much to remember for only patients with diabetes mellitus.

The DNP student project leader decided to review the charts each week of the patients that met the inclusion criteria during the planned project evaluation visits. Using the same audit tool that was developed for the providers initially, the DNP student project leader used the clinic's EMR to review charts from the week prior to collect data that was pertinent to the QI project. This worked well for the DNP student project leader and the clinic staff.

Summary

Implementation of a practice change can be difficult in any clinic. The success and smooth facilitation of this DNP scholarly QI project was obtained with the assistance of all involved parties. Without the full cooperation and assistance of the clinical staff, this QI project would not have been possible. To have a successful practice change within a healthcare system, team collaboration is required. The interprofessional collaboration of the clinical staff with this QI project's practice change was facilitated in a very efficient manner.

Chapter Six: Evaluation of the Practice Change Initiative

The purpose of this Doctor of Nursing (DNP) scholarly quality improvement (QI) project was to evaluate if using a teach-back protocol for the project site staff to deliver patient instructions would increase ophthalmology referrals by providers for patient with diabetes mellitus. The intention of the teach-back method was to enhance patient awareness of vision threatening complications of diabetes mellitus and the importance of annual dilated eye exam screenings, while encouraging the providers to remember to offer their patients with diabetes mellitus ophthalmology referrals during scheduled clinic visits. This chapter will discuss the participants, intended outcomes, and findings of this QI project.

Participant Demographics

This QI project was conducted in a small primary care clinic; there was one nurse practitioner (the project site champion) and two medical doctors. The providers were expected to offer ophthalmology referrals to all the patients with diabetes mellitus that came into the clinic for a scheduled appointment over an 8-week project timeframe. The inclusion criteria for the referrals included patients with a diagnosis of diabetes mellitus, adult patients at least 18 years of age, and patients who were seen within the clinic with scheduled appointments during the project timeframe. The DNP student project leader made weekly trips to the clinic throughout the 8-week project to review charts and collect data on documentation of the teach-back method and occurrences of ophthalmology referrals.

There were 178 total chart reviews completed on patients with diabetes mellitus during the project timeline. The age range of the patients whose charts were reviewed were from 21 years to 93 years, with a mean age of 61.9 years. Of the charts reviewed for the QI project 91, of them (51%) were male and 87 of them (49%) were female patients with diabetes mellitus. The

DNP student project leader reviewed the charts of all providers employed by the clinic. Of the total 178 chart reviews completed; 58 (33%) represented interactions by the Family Nurse Practitioner (FNP) (site champion), 105 (59%) by the Medical Doctor (MD) #1 (clinic medical director), and 15 (8%) by the MD #2 (part time provider).

Intended Outcomes

There were two intended outcomes for this QI project. The first outcome was to implement a teach-back protocol for educating patients with diabetes mellitus on the importance of regular dilated eye exams to help prevent or treat vision-related complications of diabetes mellitus promptly. The staff was expected to document in each electronic medical record (EMR) when the teach-back method was used throughout the project run time. The long-term goal of this intended outcome was to increase the awareness of vision-related complications of diabetes mellitus, such as diabetic retinopathy (DR), and to increase adherence with recommended annual dilated eye exam screenings in patients with diabetes mellitus.

The second intended outcome for this QI project was to increase the total number of provided ophthalmology referrals by 25%. The providers were expected to document in the EMR each time an ophthalmology referral was given to a patient with diabetes mellitus as well as to document if an ophthalmology referral was not given along with the rationale. Based on the assumption that a patient will be more likely to attend an appointment referred by their primary care provider, the long-term goal for this project is to increase the number of patients with diabetes mellitus receiving annual dilated eye exam screenings.

Findings

Over an 8-week period prior to the implementation of the QI project, 41 ophthalmology referrals were provided to patients with diabetes mellitus seen in the clinic. During the 8-week project implementation period, 91 of the patients with diabetes mellitus seen in the clinic were given ophthalmology referrals by the providers. This indicates a 122% increase in the total number of ophthalmology referrals given to their patients with diabetes mellitus during the QI project implementation period. This result exceeded the DNP student project leaders intended outcome of a 25% increase in provided ophthalmology referrals. Figure 1 shows the comparison of referrals given over the same amount of time before the implementation of the QI project and at the end of the QI project implementation.

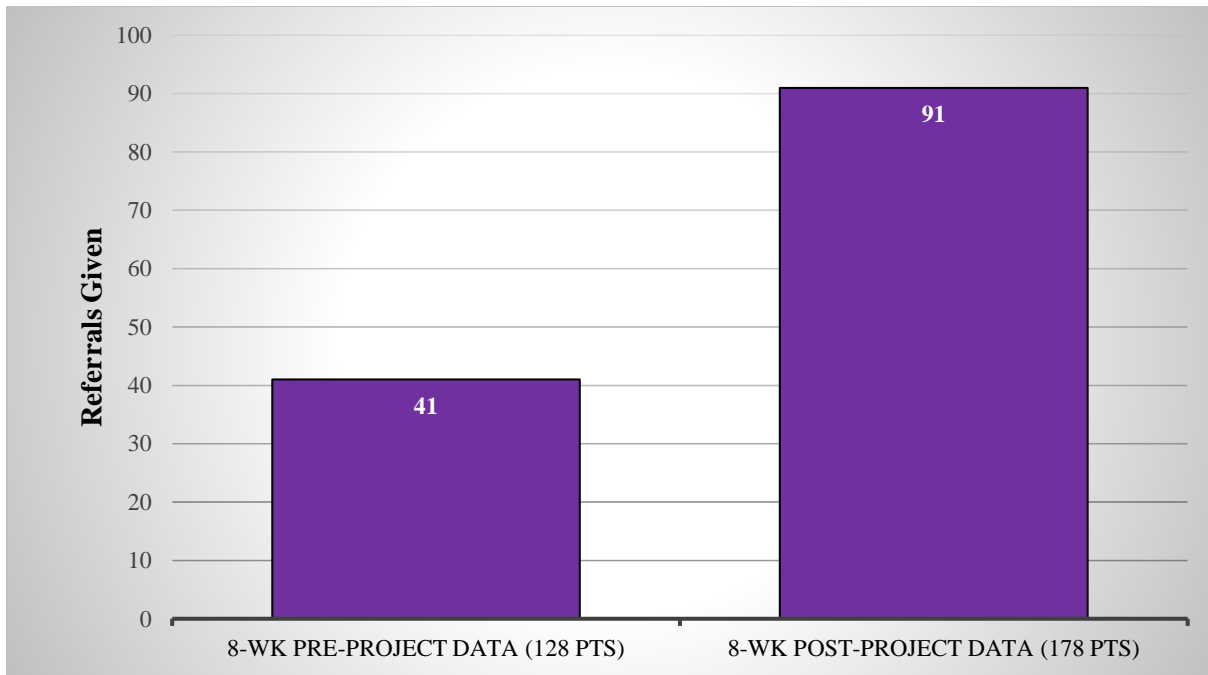


Figure 1. Total Ophthalmology Referrals Provided Pre- and Post-Project Implementation.

During the project implementation, the DNP student project leader made weekly trips to the clinic to collect data and perform Plan-Do-Study-Act (PDSA) cycles to examine ongoing

barriers and find opportunities for project improvement. Each week, the DNP student project leader collected the total number of patients with diabetes mellitus that were seen in the clinic the week prior, the total number of referrals that were provided, and how many times the teach-back method of instruction was used and documented in the EMR. The weekly findings from data collection and total percentages is compiled in Table 1.

Table 1

Weekly Data Collection Percentages

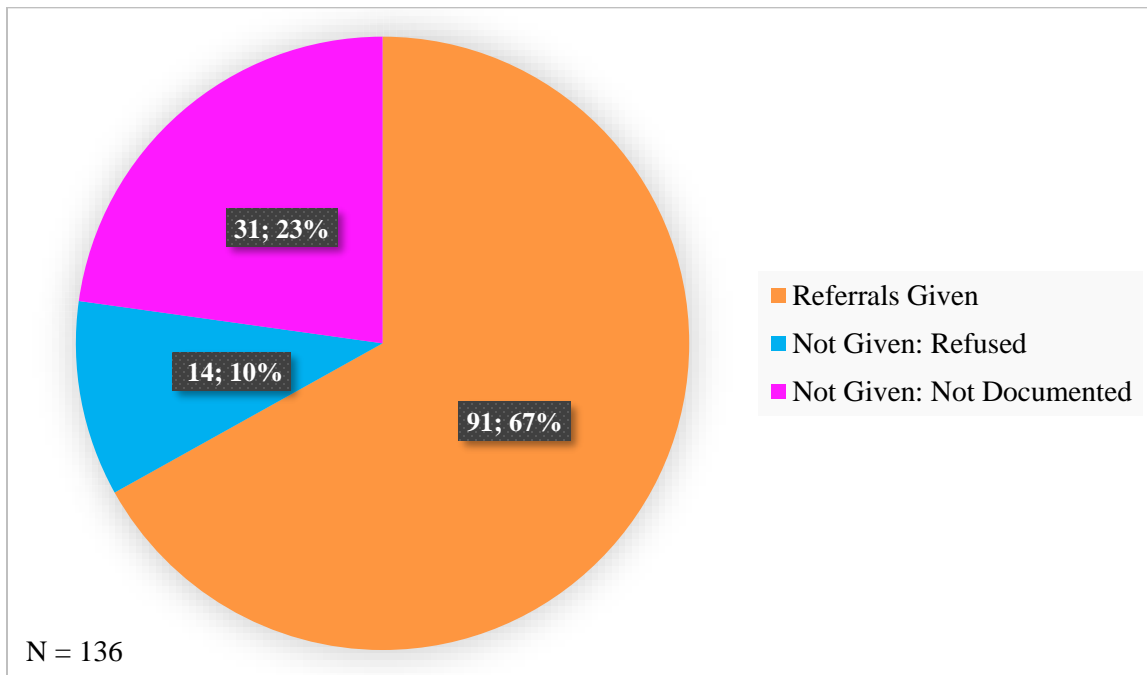
	Total Patients w/Diabetes mellitus Seen	Total Ophthalmology Referrals Given	Percentage of Referrals	Number of Times Teach- Back was Used	Percentage of Teach- Back Method
Week 1	21	9	42%	21	100%
Week 2	28	11	39%	28	100%
Week 3	24	10	42%	24	100%
Week 4	13	7	54%	13	100%
Week 5	17	9	53%	17	100%
Week 6	20	8	40%	20	100%
Week 7	27	17	63%	27	100%
Week 8	26	18	69%	26	100%

Note. N = 178

The weekly percentages of ophthalmology referrals that were given by the providers to patients with diabetes mellitus during the project implementation consistently increased during the duration of the project. The teach-back method was used 100% of the time weekly, but there was not any specific information reported as to what the teach-back method of instruction was used for during each of these visits.

During the weekly visits to the clinic for data collection, the DNP student project leader also gathered specific data on why ophthalmology referrals may not have been given to patients with diabetes mellitus. The reasons that the providers noted for not providing referrals were: 1) the patient was currently up to date (UTD) on their dilated eye exam screening; 2) the referral was offered by the provider, but the patient with diabetes mellitus refused the referral, and 3) there was not any documented reason on why a referral was not given. Out of the total 178 reviews, 42 of patients did not need ophthalmology referrals because they were up to date on their annual dilated eye exams. This left 136 of the reviews as opportunities for provider given ophthalmology referrals. Percentage and numerical data of the opportunities for referrals are presented in Figure 2.

Figure 2. Total Opportunities for Ophthalmology Referrals



Summary

The number of ophthalmology referrals given to patients with diabetes mellitus during the project increased from 41 to 91. Ending the project with a total increase of provided

ophthalmology referrals of 122%. The data collected on the use of the teach-back method was found to be inconclusive as to whether it assisted with the providers giving ophthalmology referrals. Even though the use of the method was documented 100% of the time, there was no documentation if the method was used on the need for ophthalmology referrals exclusively.

The findings of this project suggest a practice change aimed at increasing patient education supports an increase in the number of ophthalmology referrals given by providers to their patients with diabetes mellitus. Increasing the awareness of the providers and staff within this clinic on the recommended policies regarding dilated eye exam screenings for patients with diabetes mellitus also proved to aid in this practice change as well.

Chapter Seven: Implications for Nursing Practice

The American Association of Colleges of Nursing (AACN) describes the Doctor of Nursing Practice (DNP) as a terminal degree with an intense focus on advanced nursing practice that is evidence-based and innovative in nature (2006). There are eight essentials that address the core foundational competencies of the role of the advanced nursing practice; these DNP essentials must be met by all DNP graduates (AACN, 2006). These eight essentials guided the development of this quality improvement project aimed at increasing patient education and increasing provider given ophthalmology referrals to patients with diabetes mellitus. This chapter outlines the implications this quality improvement (QI) project could have on future nursing practice.

Practice Implications

The DNP prepared Advanced Practice Nurse is expected to be ready for the highest level of leadership in practice (AACN, 2006, p. 7). The goal of this DNP scholarly quality improvement (QI) project was to increase the number of provider-given ophthalmology referrals to patients with diabetes mellitus in a primary care clinic in North Carolina. Practice implications of increasing ophthalmology referrals for diabetic eye exam screenings can result in improved health outcomes for patients with diabetes mellitus by early detection and treatment of vision threatening diabetic retinopathy (VTDR). Understanding the DNP essentials and applying them during the development and implementation of the QI project helps with applying evidence-based research into current practice.

Essential I: Scientific underpinnings for practice. The DNP prepared Advanced Practice Nurse is expected to be equipped to address current and future issues that affect healthcare practice, to do this requires a strong scientific foundation (AACN, 2006). Scientific

underpinnings include: the highest level of nursing practice from integrating nursing science with knowledge; using nursing theories, and theories from other disciplines, to develop and evaluate new practice approaches; using science-based concepts and theories in the determination of the significance and nature of health and healthcare delivery; explain strategies used to enhance the delivery of healthcare, and evaluate outcomes (Chism, 2010).

Scientific underpinnings of this QI project included extensive literature research on diabetes mellitus and diabetic retinopathy (DR) and nursing theory that aided in its development. The Integrated Theory of Health Behavior Change (ITHBC), by Dr. Polly Ryan, was used to guide the development of this QI project. This theory assumes that people's everyday health practices can be changed and improved with increased knowledge and beliefs about their current health condition, in addition to the impact from influential educators available to them (Ryan, 2009). The research supporting the development of this project suggests that screenings for DR, follow up with ophthalmology, and primary provider engagement are crucial of diabetes mellitus management (Hatef et al., 2015). The American Diabetes Association's (ADA) guidelines recommend that every patient with diabetes mellitus should have an ophthalmologist performed dilated retinal eye exam on diabetes mellitus diagnosis and annually thereafter (2018).

Based on the literature research and findings from this QI project, one future area of study that could be beneficial is a project that investigates the reasons why some patients with diabetes mellitus refused the offered ophthalmology referrals. Collaboration between PhD prepared nurses and DNP prepared nurses could improve practice by finding ways to address and try to eliminate the reasons for refusals. PhD prepared nurses could design studies to research distinct reasons for patient refusals. The DNP prepared nurses could implement into practice a

quality improvement practice change based off these research findings to develop a way to decrease the number of patient refusals.

Another potentially beneficial study recommendation for the future could include a follow-up study based on this QI project. A follow-up study could focus on how many of the patients with diabetes mellitus that received ophthalmology referrals followed through with the visit to the ophthalmologist to have the dilated eye screening performed. These findings would conclude this QI project's hypothesis that providing referrals generates better patient adherence to recommendations. Both future study recommendations are areas where research findings could further improve the future outcome of patients with diabetes mellitus regarding DR along with the improvement of healthcare practice.

Essential II: Organization and systems leadership for quality improvement and systems thinking. This essential is based on the level of knowledge and skill that a DNP prepared professional should obtain to set goals that are focused on eliminating health disparities and promoting patient safety and excellence in practice (AACN, 2006). The majority of the patient population that this QI project focused on depends on Medicare and Medicaid for their health insurance. It is important for these patients and providers to be aware that Medicare part B and most private health insurance companies will cover dilated eye exams for DR every year if the patient has an existing diabetic diagnosis (U.S. Centers for Medicare and Medicaid Services, N.D.) The Centers for Medicare and Medicaid Services (CMS) also implements healthcare quality measures as tools to help quantify healthcare processes, outcomes, patient-perceptions, and organizational structures that are used to provide high-quality, patient-centered care (CMS, 2018). The healthcare organization that the project site is affiliated with uses recommended benchmarks for quality measures as an incentive for providers. Yearly bonuses for providers are

based on whether the quality measure benchmarks are met quarterly within each clinic and the whole organization.

Some of the specific quality measures are focused on patients with diabetes mellitus. Adherence to annual ophthalmologist performed dilated eye exams is a benchmark that was found to fall below the required level at individual clinics and the entire healthcare organization. There is a noted gap in patient and provider knowledge about insurance coverage for diabetic eye exam screenings and this should be addressed on all levels of the healthcare systems. Organizational and systems leadership is needed to improve the project clinic's quality metrics by taking accountability for promoting the highest quality of safe patient care. The purpose of this QI project was to increase the number of ophthalmology referrals that providers give to their patients with diabetes mellitus to increase adherence of annual dilated eye exams. This could decrease the number of VTDR for the diabetic population and increase the opportunity for this clinic to successfully meet the required organizational quality measures on this subject. If future studies find that providing referrals help with increasing the number of diabetic dilated eye exams, this could be a QI goal for all healthcare organizations across the nation.

Essential III: Clinical scholarship and analytical methods for EBP. Chism (2010) explains that the third DNP essential focuses on the expectation of the DNP graduate to use their active involvement in nursing practice to expertly apply evidence-based practices. The DNP student project leader used this essential throughout the QI project by: critically evaluating existing literature research and evidence-based practice to determine what quality improvement process would be best for this practice, which was the need to increase the quality measure regarding guideline recommended annual dilated eye exams for patients with diabetes mellitus; by designing a way to help improve healthcare practice quality by development of the QI project

to increase the number of provider given ophthalmology referrals, and by using informatics and research methodology to collect and analyze data with weekly electronic medical record (EMR) chart reviews throughout the project run time. The DNP student project leader demonstrated leadership for the promotion, implementation, and evaluation of best practice throughout this QI project timeframe with consistent observation and encouragement to the clinic staff.

Essential IV: Information systems/technology and patient care technology for the improvement and transformation of healthcare. The AACN (2006) acknowledges that the DNP prepared professionals are distinguished by their abilities to use technology and information systems to provide leadership and improve patient care and healthcare systems. This essential was used throughout the entire QI project process by using technology for literature research regarding the QI project, utilization of the project site's electronic medical record (EMR) by the providers to record information about ophthalmology referrals, and the use of the EMR by the DNP student project leader to analyze and collect data.

The EMR used in the project site flagged required healthcare quality measures for each patient derived from the diagnosis entered for each patient, for patients with diabetes mellitus these included Hemoglobin A1C readings, diabetic foot exams, microalbumin readings, and dilated eye exams. This functions in the documentation process with a “health maintenance” tab that shows up in red, indicating that this patient was past due on some of the required quality measures. The nurse or provider would need to click on that red tab to find out what needed to be updated but if they did not click on the red “health maintenance” tab then it would just remain red for the next visit. A research study completed at a family medicine clinic in Philadelphia, PA suggested that reminder/flagging/alert templates built into the EMR improves provider adherence to known guideline recommendations (McGrath et. al., 2016). This research suggests that

building an alert template into the EMR documentation system could improve the aid to increase provider given ophthalmology referrals. This could be implemented by adding an ophthalmology referral alert with the health maintenance quality measures for patients with diabetes mellitus on the front page of the EMR. The past due requirements should remain red indicating that they need attention, however, making it difficult to close out of the patients' charts without addressing this would probably encourage providers to be more consistent addressing these issues at each visit, thus, helping the patients remain up to date on all recommended health screenings.

Essential V: Healthcare policy for advocacy in healthcare. Healthcare policy is recognized by the AACN to create a framework that can facilitate or impede the successful delivery of healthcare services (2006). The DNP prepared professional should be ready to advocate for healthcare policy throughout their practice experiences (Chism, 2010). The DNP student project leader used the healthcare policies on DR screening as a driving force for the development of this QI project. Investigation and findings of current local, state and federal level healthcare policies about DR screenings were used as educational resources for the DNP student project leader to use during introduction of the QI project to the staff of the project site. The DNP student project leader made sure to analyze the perspective of health policy from various sources during the research process.

The American Diabetes Association (ADA) recommends that adults with type I diabetes mellitus have an initial dilated and comprehensive eye exam by an ophthalmologist or optometrist within 5 years of diabetes mellitus diagnosis (Solomon et al., 2017). Adults with type II diabetes mellitus are recommended to have an initial dilated and comprehensive eye exam by an ophthalmologist or optometrist at the time of diabetes mellitus diagnosis (Solomon et al.,

2017). The ADA reports that if a patient with diabetes mellitus has one or more eye exams without evidence of retinopathy, they can then have dilated eye exams every two years if they continue to have normal exams (Soloman et al., 2017). However, if any level of retinopathy is detected the patient should return to yearly reexaminations by an ophthalmologist and more frequently if the retinopathy is progressing or sight-threatening (Solomon et al., 2017). The ADA guidelines and recommendations on diabetic eye exam screenings are what influences the current policies used in the project site's healthcare institution and in the state of North Carolina.

During the policy research on DR, the DNP student project leader discovered some inconsistencies between the ADA and the International Council of Ophthalmology's (ICO) guideline recommendations on DR screenings, which could be an issue with adherence to follow up eye exams. The ICO's guidelines for diabetic eye care report that using ophthalmologist to screen every person with diabetes mellitus is an inefficient use of resources and feel that primary providers can perform complete ophthalmic examinations with refracted visual acuity and retinal imaging (ICO, 2017). The ICO recommend using minimum examination components to assure proper referrals based on the International Classifications of DR and the level of resource setting for that area (ICO, 2017). The differences of opinion on this matter could lead to refusals from ophthalmologists to perform annual dilated eye exams even with referrals, leading to patient confusion, dissatisfaction, and non-adherence to recommended guidelines. Future studies could potentially include research on how to combine the policies of the ADA and ICO to best meet the needs of patients with diabetes mellitus on an individual basis, which would be more cost effective, lead to increased patient satisfaction, and aid in ensuring that the quality of care being provided is at the highest possible level.

Essential VI: Interprofessional collaboration for improving patient and population health outcomes. It is imperative that healthcare professionals' function as highly collaborative teams in order to carry out the Institute of Medicine's (IOM) mandate for safe, timely, effective, efficient, equitable, and patient-centered care in today's complex environment (AACN, 2006). This essential was a large part of the entire process of this QI project, from the conceptualization to the final dissemination interprofessional collaboration was used by the DNP student project leader. The interprofessional team that made this QI project possible consisted of the DNP student, the university's DNP course faculty, a Family Nurse Practitioner (site champion), two Medical Doctors, project site clinic nursing staff, an office manager, and the project site's referral coordinator. The DNP student project leader was able to work collaboratively with all the above-mentioned team members as well as, employ leadership roles at times to make sure this QI project was successful.

To achieve the Triple Aim - improved population health, improved patient care experiences, and improved healthcare affordability, it is necessary to incorporate interprofessional collaborative practice approaches to healthcare (Zierler, Abu-Rish Blakeney, O'Brien, & Teams, 2018). Future recommendations for improvement of interprofessional collaboration for improving patient and population health outcomes would be for healthcare providers and institutions to engage with local, state, and federal level ophthalmologists and ophthalmology organizations. This should be done in an effort to revise the current policies and guidelines on DR screenings to better meet the needs of the diabetic patient population on a mutual and consistent level. Advanced practice nurses could aid in this by reaching out to their own local ophthalmology clinics and discussing what recommended DR screening guidelines they abide by and making sure that everyone is working together for the patients.

Essential VII: Clinical prevention and population health for improving the nation's health. The AACN defines clinical prevention as "...health promotion and risk reduction/illness prevention for individuals and families." (2006, p. 15) and population health is defined as "...aggregate, community, environmental/occupational, and cultural/socioeconomic dimensions of health" (2006, p.15). The ADA enforces current standards of care for providers to use for the health promotion and disease prevention for patients with diabetes mellitus. These include preventative care service such as screenings for eye disorders, cancers, neuropathy of the feet, and dental complications (ADA, 2017). Referrals for ophthalmology or optometry should be provided on diabetic diagnosis if the patient has type II, with follow up every 1-2 years depending on results of the initial screening (Solomon et al., 2017). Ophthalmology referrals should be provided if there is any detectable level of DR noted during diabetic eye exam screenings including the use of telemedicine retinal screenings (Jani et al., 2017). The focus of this QI project was to try to improve the outcomes of the diabetic patient population by increasing provider given ophthalmology referrals within the project site to screen for vision threatening complications like DR. The practice implications of this QI project include healthcare providers consistently giving ophthalmology referrals to their patients with diabetes mellitus in an effort to improve the care and health outcomes of this patient population.

Essential VIII: Advanced nursing practice. The final DNP essential explains the foundational practice competencies that are required for all DNP prepared professionals. According to AACN, the DNP prepared professional should be competent in: comprehensive and systematic assessment of complex situations; plan, implement, and evaluate effectiveness of therapeutic interventions; develop and maintain therapeutic partnerships with their patients, their patients' families, and other healthcare professionals to facilitate optimal care; demonstrate

advanced levels of clinical judgement, thinking, and accountability while providing patient care; guide, support and mentor other nurses to achieve excellence in practice; provide education through complex health situations; and use conceptual and analytical skills in evaluating practice (AACN, 2006). Establishing partnerships with motivated, informed, chronically ill patients and promoting change in healthcare policy, guidelines, and meeting patient educational needs is the perfect job for nurse practitioners because of their training and expertise in patient education. (Holstein, 2018).

There have been several potential future studies mentioned that could be developed from this QI project to continue to improve practice in screening for DR in patients with diabetes mellitus. Some recommendations for practice include consistency among providers with acknowledging the importance of dilated eye screenings in patients with diabetes mellitus and supplying referrals to these patients whenever they are needed (Silva et al., 2016). Nurse educators could take this a step farther as they prepare nurses for advanced practice by including the education needed about the impact of DR on patients with diabetes mellitus and stressing to them the importance of providing referrals to aid in the prevention and improve the outcomes of DR (Keel et al., 2017). Learning to incorporate a practice from the beginning of a student's training makes a better lasting impression than trying to change the practice of an already established provider.

Summary

With the complexity of today's healthcare system, it is essential to increase the level of education of the Advance Practice Nurses providing care. The eight DNP essentials assist the DNP graduate to merge the concepts of nursing science, healthcare practice, human needs, and human caring to provide the highest level of care possible (Chism, 2010). The DNP project

student leader used the eight DNP essentials by designing and implementing a QI project that was based on evidence-based research to improve healthcare provided to patients with diabetes mellitus in a small primary care clinic. Interprofessional partnerships were formed to improve the care provided to patients with diabetes mellitus using evidence-based research, policies, change models, and theories. While this QI project was implemented in a small primary care clinic, expansion of the project could have a much larger effect on the healthcare provided to the diabetic population in the future.

Chapter Eight: Final Conclusions

The completion of this Doctor of Nursing Practice (DNP) scholarly quality improvement (QI) project has led to many conclusions for the DNP student project leader. This chapter will discuss the significance of findings on healthcare practice, strengths and limitations of the project's implementation, any important benefits uncovered from the practice change, and recommendations for future practice that stem from results of this QI project.

Significance of Findings

The results of this QI project showed that there was a 122% increase in ophthalmology referrals given during the 8-week project implementation period from the number of ophthalmology referrals given in the 8-week pre-project period. Data showed that there were higher percentages of referrals provided during the last two weeks of the project timeframe than there were during the beginning weeks. The DNP student project leader felt that weekly PDSA meetings and encouragement of providers to continue offering referrals assisted in making the QI project successful.

Using the teach-back method of patient instruction helped to ensure that the patients with diabetes mellitus understood the information provided to them about complications from diabetes mellitus and coordination of care with ophthalmology. Ensuring patient understanding aids in providing the highest level of care (Caplin & Saunders, 2015). Providers within the project site reported to the DNP student leader that using the teach-back method to ensure adequate patient awareness was eye-opening. They reported that this helped to motivate them to provide referrals and encourage their patients to obtain the recommended eye screenings.

Project Strength and Limitations

Some strengths of this QI project were the dedication and active participation in the development and implementation from the project site champion. Another strength was the active participation and interprofessional collaboration from all the clinic staff involved at the project site. Having access to the organizational policy and the American Diabetes Association (ADA) guidelines on diabetic eye exam screenings was another strength. The availability of these guidelines made it easier to promote the intended outcome of increasing ophthalmology referrals for patients with diabetes mellitus. The teach-back method is an evidence-based strategy and free for provider use making these additional strengths for the QI project as well. A final strength includes the availability of the project site's electronic medical record (EMR) documentation system which already used the teach-back method.

One limitation of this project included the inability to determine if the teach-back method of patient instruction was used for education on the need for ophthalmology referrals exclusively or if it was documented after being used for some other form of patient education. This may have triggered the 100% usage of the teach-back method data result to be inconclusive on whether this directly affected provided ophthalmology referral numbers. This limitation could be addressed in future projects by assessing if there is a way to specifically document what the teach-back method of patient instruction is being used for each time. Another limitation was that the 8-week pre-project data did not give any information on how many of the 128 patients with diabetes mellitus seen needed an ophthalmology referral. If some of those patients were up to date on their annual eye exam, this would change the total number of opportunities for referral, hence changing the percentage of referral increase at the conclusion of the QI project.

Project Benefits

There were several benefits that meet the intended outcomes of this QI project ensured. Senitan, Alhaiti, and Lenon (2018) reported that providing ophthalmology referrals are important to ensure continuous care for patients with diabetes mellitus. Increasing the number of referrals given by the providers to their patients with diabetes mellitus aided in improving the quality of care that the providers in the project site clinic gave to their patients. Providing ophthalmology referrals to patients with diabetes mellitus also helps in improving patient outcomes. Silva et. al. (2016) reported that timely ophthalmology referrals can decrease the rate of diabetes mellitus related vision loss. Another benefit of this QI project is that the implementation of this QI project did not require funding. The resources available to the project site included the necessary resources to implement this practice change in other primary care clinics affiliated with the large healthcare system in that area.

Recommendations for Practice

Recommended future QI projects to expand on these preliminary findings could be to examine the number of patients with diabetes mellitus that were given referrals to evaluate how many of them followed through with the dilated eye exam. Another potential QI project could involve investigation on the factors contributing to patient refusals of ophthalmology referrals. The student project leader of that QI project could examine the possible barriers that prompted the patients to refuse the referral that was offered and build on that as a way to remove those barriers for better care. An additional future QI project could examine barriers that may have prohibited patients that were provided referrals from going to ophthalmology appointments and find ways to help with removing those barriers. Findings such as inadequate understanding by

the patient on the reason for referral, needing improved patient/provider communication, and reminders of the scheduled follow up appointments have been noted as barriers in past studies (Kim, Jeoung, & Park, 2017). A recommendation for current practice based on this QI project findings would be for the DNP student project leader, project site champion, and providers to continue to diligently inquire about annual eye exams and offer ophthalmology referrals to the patients with diabetes mellitus that need them within their own practices. These same providers could also spread the word to colleagues and the leadership within their practices about the QI project findings and suggested practice implications with provider given ophthalmology referrals as a way for other providers to adapt the practice change.

The teach-back method of patient instruction was used in this project as an evidence-based tool to assist with adequately increasing patient awareness on negative risks that diabetes mellitus can have on vision. This evidence-based teaching tool should be used in all healthcare practices daily to ensure effective staff communication and validation of patient understanding regarding all chronic illnesses (Caplin & Saunders, 2015). One future project could be to research a little more into the teach-back method and find a way to see if when the method is used exclusively for the purpose of raising awareness of vision-related complications of diabetes mellitus, did this improve the referral number even more than this QI project did without that information. An organizational policy change to include required provider given ophthalmology referrals annually may be a needed recommendation for this practice to continue to increase the referral number. Adding electronic medical record (EMR) flagging to the current system for ophthalmology referrals may be another way to improve the practice and referral rates (McGrath et al., 2016). There are many ways to use this QI project to improve other areas of nursing practice and these mentioned are just a few.

Final Summary

Research on diabetic guidelines find recommendations that every patient diagnosed with diabetes mellitus receive at least annual dilated eye exam screenings performed by ophthalmology to help prevent vision loss related to diabetes mellitus. Review of literature shows that referrals to ophthalmology for eye exams result in better patient centered clinical care and better patient health outcomes. The purpose of this QI project was to increase the number of ophthalmology referrals that providers give to their patients with diabetes mellitus during scheduled primary care office visits. Results suggests that by providing education and raising awareness of the importance of annual dilated eye exam screenings to patients with diabetes mellitus, this prompted providers to give more ophthalmology referrals to their patients than without the education. Future project recommendation combined with the knowledge obtained from the results of this QI project could mean improved health outcomes and higher quality of care for the population that is afflicted with diabetes mellitus.

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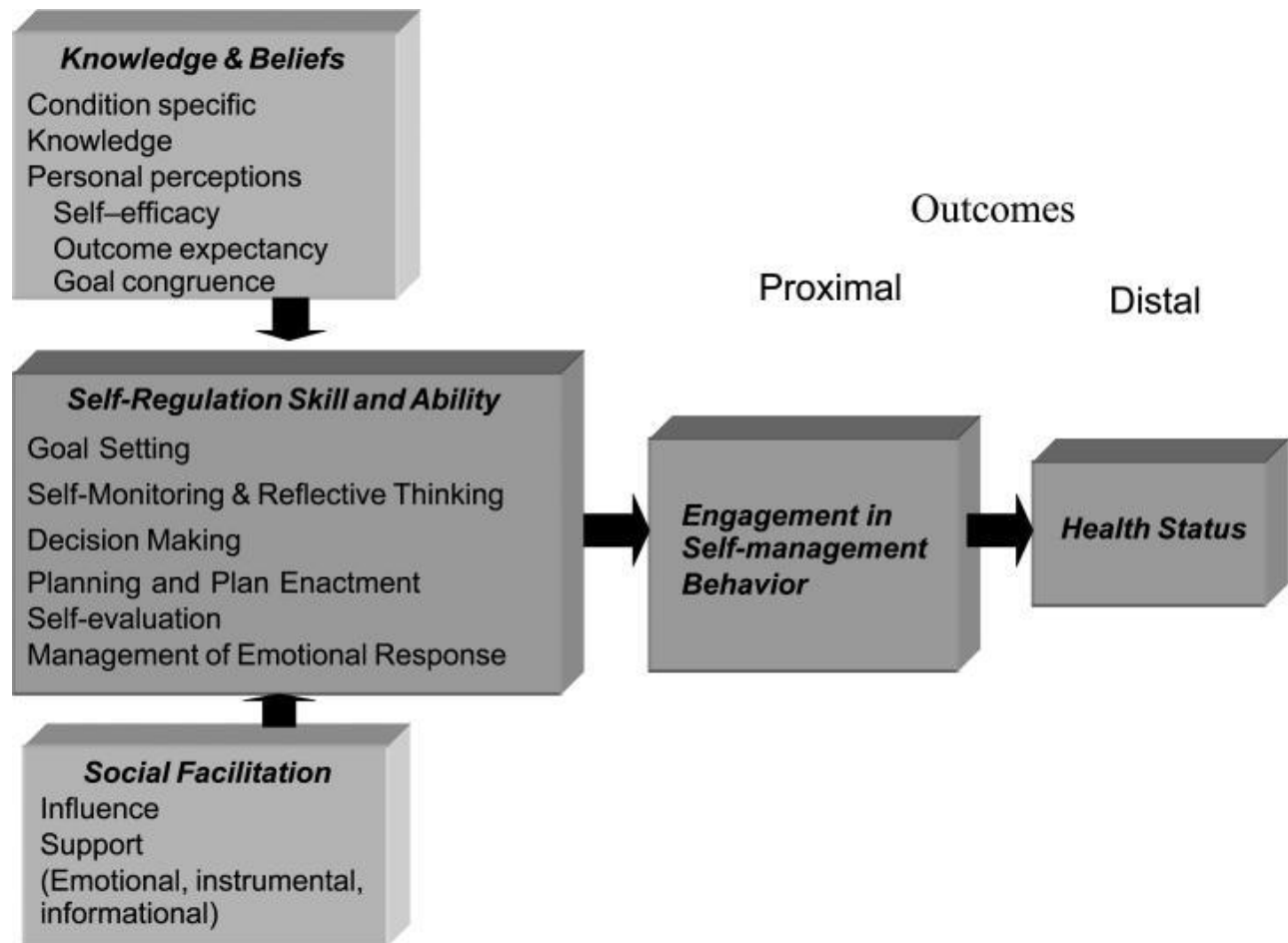
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Appendix A

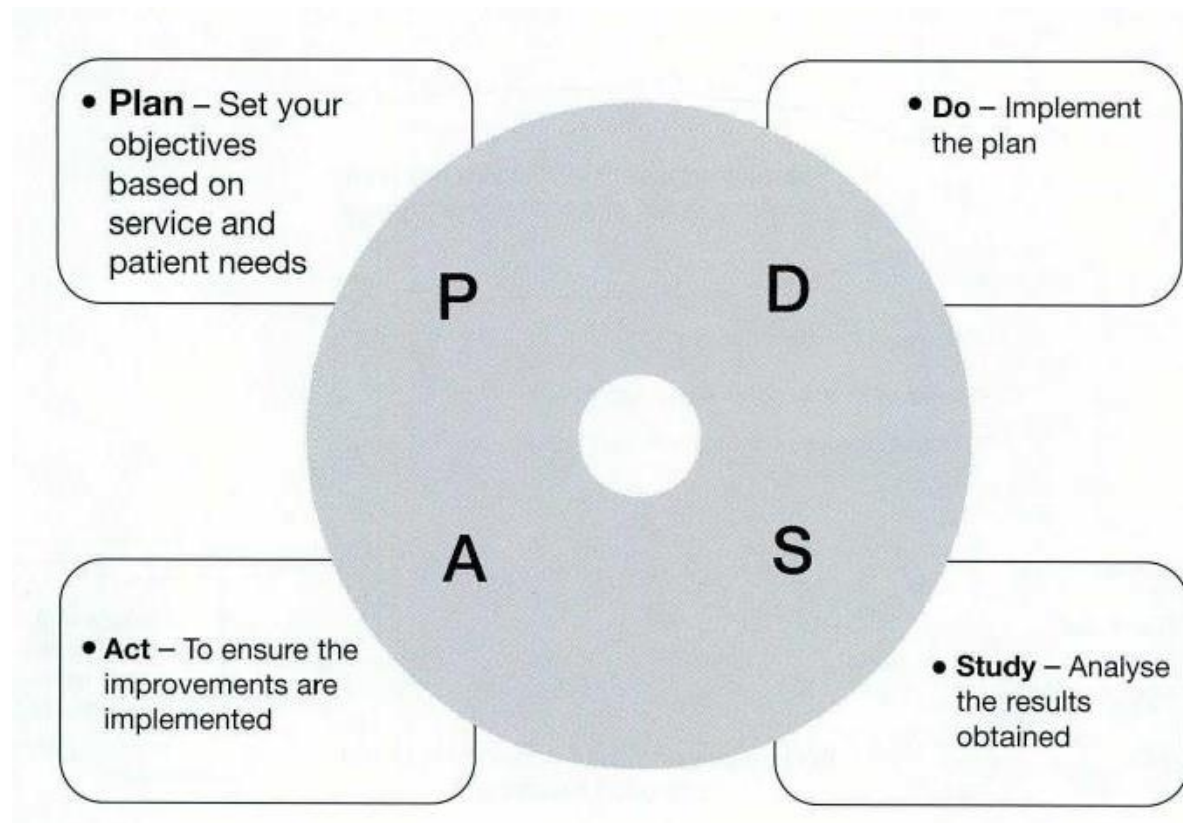
Integrated Theory of Health Behavior Change Model



(Ryan, 2009)

Appendix B

The PDSA Cycle



(Donnelly & Kirk, 2015)

Appendix C

DNP QI Project Audit Tool
Heather R. Thomas

Date:

Chart Audits	Teach-Back Completed	Verbalized Understanding	Ophthalmology referral given (and reason if not given)

Legend for comments: R – patient refused; NR – no reason was listed;
UTD – patient has had ophthalmology visit within the past year