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The Effect of Health Literacy in Low Estimated Glomerular Filtration and Diabetes

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This is to certify that the doctoral study by

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Walden University
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Abstract

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MS, Graceland, 2005

BS, University of Phoenix, 2002

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Health literacy is widespread, but its potential is not recognized. By not recognizing health literacy, patients have the burden of coping with diabetes with renal complications without full knowledge of their responsibility to their health. The focus of the project was to assess participants with diabetes with low health literacy and low mean glomerular filtration rate (eGFR). The project goal was achieved by the assessment of the participants' health literacy and eGFR before and after education for their diabetes, then assessed to determine if teaching the participants would improve their health literacy, lab values, and overall health. Participants were recruited by being patients of the designated clinic and screened for diabetes and low eGFR, for a total of 30 participants. The Brief Health Literacy Screen was used to measure health literacy. The health of the participants was appraised by the laboratory values of eGFR and fasting glucose. The project methodology was an observational design using correlation and 2-sample *t* analysis with the variables eGFR, fasting glucose, and health literacy. The variables were compared before and after the participants' education. Results showed health literacy with patient education was associated with greater patient self-efficacy and improved fasting glucose numbers, eGFR flows, and health literacy scores. The current health climate shows value in different types of health providers. Social change was defined by the project launching a nurse practitioner as the leader for advancing the treatment plans of chronic kidney disease. This project impacts social change by showing patients in the process of improved health and empowering the patients to be advocates of their own health.

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Dedication

This project has been dedicated to my loving husband, Roy, who always encourages me to strive to be my best. To my wonderful children, Paul and his wife Carrie and Anita plus her husband Willard who always love and support no matter what circumstance. To my precious grandchildren, Mikey, Max, and Jack, who inspire me to be a model of working hard to achieve goals. To Carol my friend and sister-in-law who always provides help when needed to make life easier.

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I wish to recognize my mentor, Dr. David Lensch, whose guidance has helped me to further my education and professional growth. A very special acknowledgment and thank you to Dr. Mary Verklan, her patience has been unending and her feedback valuable and without her help and recommendations the project and paper would have not survived the process. I will not forget her as a professor and mentor.

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Section 1: Nature of the Project

Introduction

The act of providing patients with health care information is not sufficient to ensure that patients would make the necessary modifications to their lives to improve their health. Handouts given to patients about their illness or health do not guarantee patients understood the handouts and followed their health treatments (King, 2010). Health literacy is the capability with which the individual attains, processes, and comprehends simple health and services required to make necessary health decisions (Koh, 2010). Low health literacy has a crucial role in patients misinterpreting their health education, which made any attempt by the health provider to educate the patient fruitless (Koh, 2010). The more complex the chronic disease, the poorer adherence to medication and health management was shown (Chandra et al., 2011). The unrecognized prevalence of health literacy puts the burden of poor health on these patients, leaving many patients with poor outcomes, specifically Type II diabetic patients with chronic renal disease (Parker, Ratzan, & Lurie, 2013).

The focus of the project was assessing limited health literacy, specifically in Type II diabetes where there is a high association of low mean glomerular filtration rate (eGFR) which is the precursor to chronic renal disease (Ricardo et al., 2014). The goal was to prevent renal failure leading to end-stage glomerular failure. The attainment of the goal of preventing renal failure was achieved by regulating the diagnostic marker that presented a low eGFR was the point in the disease process where renal disease could be decreased or stopped.

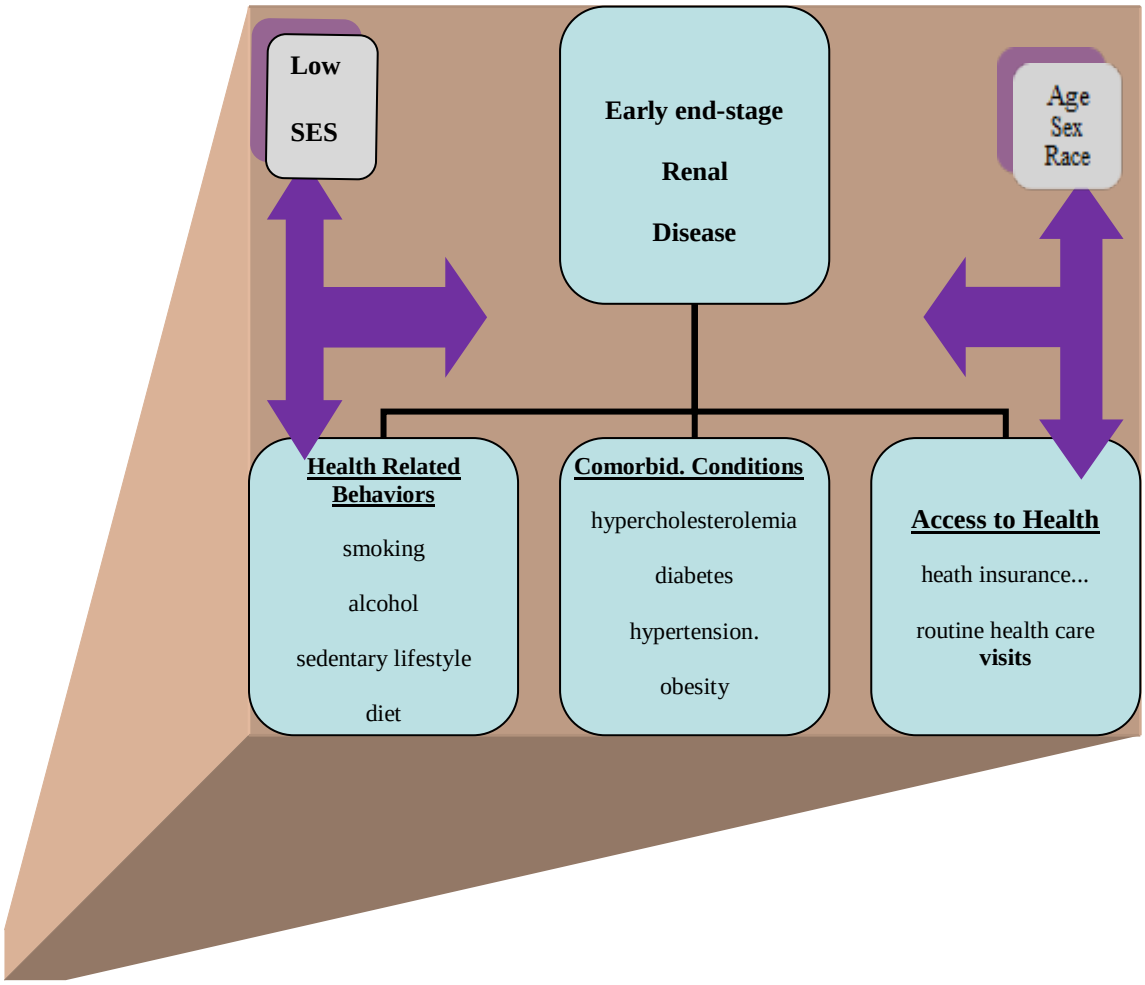
My project was cultivated from the serious risks of diabetes which generates chronic renal disease. The understanding of chronic renal disease (CRD) and its relationship to health literacy were important to the project because this understanding could improve the status of the patient and provide better health outcomes. This paper presents a Doctor of Nursing Practice (DNP) project directed at improving health literacy in patients with diabetes which have low eGFR leading to chronic kidney disease (CKD). This paper provides an overview of the project, a review of scholarly evidence, and an outline of how the project will be operationalized.

Background and Context

The clinic where I care for patients has a population of diabetic patients (42%) requiring an assessment of their health literacy (the Rockwall County Helping Hands Board, 2015). The necessity for the assessment of health literacy was due to their low socioeconomic class and lower educational background. The mean education level was 9th grade with a reading level below 5th grade (the Rockwall County Helping Hands Board, 2015). The population was young when they married and started raising families, requiring many hours in their occupation to provide adequate financial support for their family. Continual working and eating fast food without exercise has predisposed this population to gain weight and developing diabetes. Of the adults with diabetes, it was estimated that 20% to 40% will progress to overt (chronic kidney disease) CKD (Pyram, Kansra, Baneraji, & Hutchinson, 2012).

In the clinic population, 25% of diabetic patients have CKD (the Rockwall County Helping Hands Board, 2015). One of the concerns that arose with the clinic

patients was related to their inadequate health insurance and a socioeconomic status (SES) that was below the 200% poverty level (the Rockwall County Helping Hands Board, 2015). Thus, patients would not have resources to see specialty physicians or receive special treatments for CKD (the Rockwall County Helping Hands Board, 2015). The meaning of preventive care for this population cannot be over stressed as it advances outcomes and decreases health costs. The figure below diagrams vulnerable populations that have socioeconomic inequality and adverse health-related behaviors, existing comorbid conditions, and limited access to health care, which would be pathways leading to CKD (Vart, Gansevoort, Crews, Reijneveld & Bultmann).



(Vart, Gainsevoort, Crews, Reijneveld, & Bultmann, 2015)

Figure 1. Pathways assumed for mediators between SES and CRD

CKD causes significant disability and contributes to high health care costs if not identified before irreversible kidney changes could progress to end-stage kidney disease and cause death (Pyram et al., 2012). The early detection of CKD was the single most important objective to maintain a patient's kidney function. In many clinics, the mean

eGFR was not used for clinical decision making as most health providers depend on creatinine levels to represent kidney function (Levey, Becker, & Inkler, 2015). However, the eGFR decreases prior to creatinine levels, and it is at this point where reversal of eGFR could take place and help restore kidney function (citation). Pinpointing the diagnostic marker of eGFR was pivotal to patients with Type II diabetes due to the nephropathy that causes CKD. Type II diabetic nephropathy transpires during high blood sugar levels and the kidneys start to over filter the blood (citation). Over time, the excessive filtering damages the kidneys and the kidneys begin to leak proteins (Levey, Becker, & Inkler, 2015).

The factors that provided the stimuli for this project were the circumstances of vulnerable patients that have low health literacy (Koh, 2010). The vulnerable patients that have Type II diabetes were prone to CKD and could be made aware of the early signs that could be treated lowering the sequelae of CKD. Moreover, those patients with low health literacy could be assisted to increase their health literacy and improve health outcomes (Bailey et al., 2014). A new awareness has been needed for health providers, a cognizance of diagnostic markers important in assessing CKD. The health provider has a big opportunity to be of assistance to the patient in increasing their health literacy and be active in their care. The prospect to reverse CKD early in Type II diabetic patients would be a possibility for the patient to lead a healthier life.

Problem Statement

The project's primary purpose was to assist low literacy clientele in addressing the complications of their diabetes and prevent advancement of their disease to CKD

(Levey, Becker, & Inkler, 2015). Diabetes mellitus (DM) is a key precursor of CKD due to nephropathy (Ricardo et al., 2014). Renal failure necessitates healthy lifestyle modifications and conforming to medication and dietary challenges that are demanding for patients with low health literacy (Ricardo et al., 2014). The first sign of early end-stage renal failure (ESRF) is a decreased flow of glomerular filtrate, which is reported as low eGFR (Ricardo et al., 2014). Surveillance of kidney function is vital as low eGFR closely coincides with diminishing kidney function and may be reversible in the early stages (citation). Health literacy is a major difficulty in kidney failure as patients who do not understand their health cannot manage their disease, and the kidney failure worsens.

Chronic kidney disease affected racial and ethnic minority groups more than non-Hispanic white groups due to their higher prevalence rates of Type II diabetes (Hall et al., 2013). The implementation of the project occurred at a clinic with a population that is 38% Hispanic (Rockwall County Helping Hands Board, 2015). Table one shows the different types of ethnic minorities treated in the clinic (Table 1). Hispanics had a high risk of CKD that becomes end stage renal failure rapidly, specifically in the urban poor (Hall et al., 2013). The urgency to assess and treat traditional risk factors for progressive CKD was significant to decrease the burden of ESRD among vulnerable populations (Hall et al., 2013).

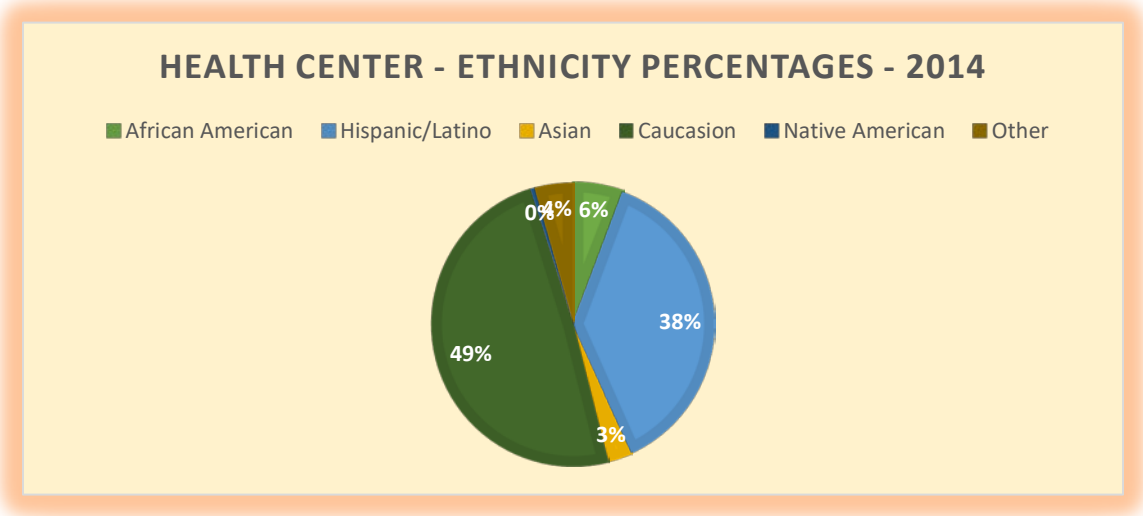


Figure 2. The ethnicity percentages for the clinical population. by Rockwall County Helping Hands Board Report, 2015.

Results showed chronic kidney disease was more frequent than expected, and often the patient was asymptomatic when diagnosed (Hall et al., 2013). The association of chronic kidney disease increases in cardiovascular events and mortality (Hall et al., 2013). Knowing that CKD was silent in its presentation and brings high risk adverse effects suggested that there was tremendous value for population-based screening of CKD. The American Society of Nephrologists (ASN) advised that all adults, even healthy adults, undergo periodic screening for CKD (Reutens, 2013). However, patients with diabetes presented CKD without knowing they had diabetes. When diabetes presented itself, it was important to treat the disease preventing the progression and the adverse effects of chronic diseases such as CKD. The burden of CKD was enormous, and the burden would have greatly increased unless strategies were established to avert the onset

or progression of CKD and have CKD detected early in the development of diabetes (Reutens, 2013).

Purpose Statement

The project's objective was to assess the health literacy in patients diagnosed with Type II diabetes who presented with a low eGFR. The diagnostic marker eGFR was essential for the health provider to assess and manage kidney function. Therefore, an early reversal of the eGFR could be proactive in maintaining kidney function (Ricardo et al., 2014). Many patients with diabetes understood the laboratory value of glycated hemoglobin (Hgb A1C) and knew it was an important number to evaluate their chronic diabetes. However, the value of eGFR was foreign to most patients, thus relaying an abnormal eGFR to a patient was not a red flag relating to their disease process (Ricardo et al., 2014). The purpose of this project was to help patients understand their disease process and assist them in adhering to lifestyle and medication regimes that could reverse their kidney injury (Ricardo et al., 2014).

The expectancy of the assessment and treatment of the eGFR promptly was regarded as the regression of CKD or improvement of kidney function, and the progression of health outcomes for the patient. The observation of eGFR was a more careful evaluation of the patient's renal function by the health provider and was a more thorough assessment of the patient's kidney health (Ricardo et al., 2014). A complete assessment of the patient's health literacy proved to enhance the relationship and rapport with the patient and the health provider (Ricardo et al., 2014). A better type of relationship translated to an advanced state of understanding and knowledge for the

patient. There are vast amounts of literature that portrayed the relationship between the patient and the health provider (Berkman, Davis, & McCormack, 2010; Clancy, 2009; Rak, 2014). However, health literacy was a new topic in the medical literature that focused on an improved relationship between the patient and health provider, and encouraged better listening and conversation with the patient (Ward-Smith, 2012). Health literacy was not a constant and did change with different stimuli such as time, education, or experience (Clancy, 2009). Furthermore, improving health literacy had implications for improved health and indicated future problems that could develop with neglected health.

Project Objectives

The project's first objective was to measure the health literacy of the patient with diabetes who was demonstrating signs of CKD. The Brief Health Literacy Screen (BHLS) was used to measure health literacy in patients, which takes approximately three minutes to complete. The BHLS was used and validated in outpatient and emergency department settings. The screening test consists of three items on a 5-point response scale, read aloud to participants so participants who cannot read could still be tested (Sand-Jecklin & Coyle, 2014).

The second objective was to increase health literacy from a low level to a higher level to enable the patient to understand his health needs. Increasing health literacy will be done by providing education to the patient to increase health comprehension regarding his health process. Health literacy was measured using the BHLS tool. Low health

literacy can be increased through patient teaching relating to the patient's health process and needs. The education was done in the clinic where key points regarding the renal system and ways to improve kidney function were reinforced. The teaching and instruction helped patients understand their health more effectively. Part of this objective included the re-evaluation of health literacy after the instruction. Re-evaluation of health literacy occurred after the education program using the same BHLS tool. The re-evaluation assessed whether an increase in health literacy occurred and whether reinforcement of the education was indicated.

The re-evaluation helped the health provider determine the status of the health literacy and how health literacy guides quality improvements by either improving health outcomes or not. A positive reevaluation, using the BHLS instrument, was measured as a score of 19 or greater which indicates an adequate or high literacy while a score less than 19 identifies patients with health literacy limitation or low literacy (Sand-Jecklin & Coyle, 2014). An increase of health literacy provides evidence of a successful health communication between the health provider and patient leading to a fuller measure of health literacy.

The third objective questions how health literacy affects the eGFR. The effect of health literacy was revealed by variations in diagnostic markers and eGFR. The health literacy improvements and the development of the diagnostic markers indicated a positive effect of augmented health literacy. An assessment was needed to identify the level of the patient's health literacy, also whether the educational intervention increased his/her health literacy, and impacted the eGFR. After completing an assessment of health

literacy, an individualized teaching plan was created to grow the health knowledge of the patient. The individualized teaching plan assisted the healthcare provider to communicate effectively both in written and oral terms to help the illiterate health patient (Cornett, 2009). A negative impact of low health literacy was the patient's inability to manage his/her disease process effectively.

Project Question

The project question, "How does health literacy affect the low estimated glomerular filtration rates in patients with diabetes?" is a significant question. The question created a link between limited health literacy, commitment to care, and management of diabetes, to prevent CKD (Ricardo et al., 2014). Healthcare knowledge and treatment completed the modification in the eGFR returning to normal. The project question raises the issue that renal problems diagnosed late or under diagnosed may facilitate into chronic renal disease or failure

Significance of the Project

The increased use of eGFR as part of the laboratory analysis has brought awareness that early kidney disease could be diagnosed expeditiously and treated earlier (Patel et al., 2012). The timely recognition of low eGFR increased the chances for the implementation of safety standards for patients and the avoidance of detrimental renal outcomes (Patel et al., 2012). Health literacy directly affected the patient's capability to pursue, understand, select, and conform to any health care situation (Ward-Smith, 2012). Thus, patients with low health literacy and diabetes were at a higher risk for a poor prognosis for remaining healthy. Perceptions of patients' attitudes, prejudices, and

behaviors, including health literacy, should have been part of a health care plan. Communication, easy to understand handouts, and translators to minimize any language barrier increased patients' comprehension of his/her illness by increasing health literacy (Ward-Smith, 2012). Acknowledgment and treatment of health literacy assisted the patient in dealing with diabetes effectively and prevented the progression of kidney disease, thereby improving health outcomes.

Diabetic nephropathy was the leading cause of CKD worldwide (Patel et al., 2012). CKD was one of the most significant long-term complications in terms of morbidity and mortality for patients with chronic diseases, especially diabetes (Ward-Smith, 2012). Renal problems diagnosed late or under diagnosed may progress from early kidney disease to renal failure rapidly (Patel et al., 2012). Determining the patient's health literacy was the first step that assisted the patient to realize the extent of his/her disease and empowered the patient to partake in the healing process. Knowing the patient's level of health literacy helped the healthcare provider realize how much a patient understood their disease process and enabled an individualized plan of care appropriate to the patient's unique needs. The early diagnosis and treatment of low eGFR was vital to decrease renal disease, and the evaluation of health literacy helped the patient's compliance to obtain optimal health outcomes.

Reduction of the Gaps

Low health literacy was typically not differentiated among the other health problems that patients present with. The patients were reluctant to disclose their low health literacy level because of being too ashamed to admit they could not adequately

read or comprehend the health information given to them (Kindig, Panzer, & Nielsen-Bohlman, 2004). In addition, limited health literacy was not restricted to a patient's problem, but also included the health provider. As health systems have become progressively complex, adding new technologies, scientific terminology, and increasingly difficult medical procedures and forms, giving care to patients has been more complex and harder for patient comprehension (Kindig, Panzer, & Nielsen-Bohlman, 2004). Health literacy is not only a problem of patients but also the health provider. Without a high health literacy score patients cannot be compliant to the health treatments of their chronic disease and the health provider cannot care for the patient adequately (Kindig, Panzer, & Nielsen-Bohlman, 2004).

A health provider needs to realize that one third of their patients have low health literacy, conversely, and the rate increases to half with the population subgroups of older adults and racial ethnic minorities (Weiss, 2014). Health providers must become skilled at detecting indicators that a patient has had difficulty reading, or requested help from a companion to read their health information or instructions (Weiss, 2014). Health literacy included the skills of reading, writing, numeracy, listening and speaking, as well as cultural and conceptual knowledge (Weiss, 2014). Healthcare providers need to become increasingly conscious of the discussion and the direction of their patient's problems related to low health literacy (Kindig, Panzer, & Nielsen-Bohlman, 2004). Even though a variety of educational programs and resources to address health literacy have been developed, these approaches have not been integrated into health literacy strategies that would aid patients. Health providers require a redesign of processes that could help with

the communication and education of patients (Kindig, Panzer, & Nielsen-Bohlman, 2004). Health literacy is an important element in health care that is not readily used to aid the patient. The project initiative will show the enhanced progress of utilizing health literacy in plans of care used by the health provider.

Interpersonal care and technical processes of care were instrumental to the overall value of health care. Interpersonal care processes included patient-health provider communication (Schillinger, Bindman, Wang, Stewart, & Piette, 2003). The quality of interpersonal care processes was associated with a patient's self-care behavior, which directly related to health literacy. A method to increase health literacy with interpersonal care processes was used to recognize what information patients understood and was used for self-care, and to inform patients of their medical condition in ways they understood (Schillinger et al., 2003).

Low health literacy affects the explanatory/participatory dimensions of a patient-health provider communication, but does not affect the listening dimension of communication (Schillinger et al., 2003). Understanding what kinds of language, the patient comprehends placed the focus of the communication on what the patient would learn from. The conversation was more successful between the patient and the health provider when the discussion centered around the health behaviors related to the patient self-care instead of the more technical explanation of the disease (Schillinger et al., 2003).

Implications for Social Change

Health literacy is a problem that prevents patients from managing their own health. Healthcare costs increased with decreased health literacy. In 2000, nearly half of the United States' population had a chronic disease, with direct medical costs for related conditions of $30-37 billion annually (Parker, Ratzan, & Lurie, 2013). In most cases, patients with chronic diseases have more health demands and fewer health literacy skills (Parker et al., 2013). Health literacy specifically required using information derived from healthcare for it to have a positive effect on one's own health (Koh, 2010).

When a patient with diabetes was educated about diabetic ketoacidosis (DKA) and diet together with medication adherence, the patient related it to his/ her illness and proactively acted so his/her illness did not become progressively worse (Benyon, 2014). A patient's understanding of Type II diabetes is essential for his/her competencies of self-sufficiency and empowerment. Low levels of health literacy were associated with a lower commitment to preventative healthcare, such as screening tests and vaccinations (Benyon, 2014).

Nonclinical factors such as patients' socioeconomic status and psychosocial traits play a factor in the patient's risk as well. Health literacy in chronic diseases was theorized to be the main factor that decreased adverse health outcomes (Bailey et al., 2014). Health literacy problems were more common in the United States than was generally realized as the National Assessment of Adult Literacy noted that one-third of U.S. adults had rudimentary or below health literacy, which was not enough to manage health medication or diet, important to managing Type II diabetes (Bailey et al., 2014). The problem of

health literacy centers on the assistance of the health illiterate population to be better informed about their health. Influencing these patients through education was a considerable challenge as this population consists of patients in a lower socioeconomic sphere and they were harder to encourage (Benyon, 2014).

Definition of Terms

Creatinine: Creatinine is a laboratory analysis that measures the excretion of the muscle tissue (Goldhaber, Ness-Abramof, & Ellis, 2009). A creatinine level of greater than 1.2 for women and 1.4 for men is a sign of kidney dysfunction (Goldhaber et al. 2009).

Chronic kidney disease: Also known as chronic kidney failure, chronic kidney disease describes the gradual loss of kidney function. When chronic kidney disease reaches an advanced stage, dangerous levels of fluid, electrolytes, and wastes can build up in the body (Reutens, 2013).

Estimated mean glomerular filtration rate (eGFR): eGFR describes the flow rate of filtered fluid through the kidney (citation). The normal value for eGFR is 90 or greater. An eGFR below 60 is a sign that the kidneys are not functioning (Goldhaber et al. 2009). An eGFR below 15 indicates that treatment for kidney failure, such as dialysis or a kidney transplant, is required (Goldhaber et al. 2009).

Health literacy: Health literacy is the degree to which individuals have the aptitude to gain, process, and comprehend basic health information needed to make appropriate health decisions and services needed to prevent or treat illness (Koh, 2010).

Hypertension: Hypertension is clarified as elevated blood pressure of 140/90, and for individuals that are older than 60 years of age, with a blood pressure of 150/90 (Papadakis, McPhee, & Rabow, 2014). The stages of hypertension are Stage 1: Systolic 140-159 or Diastolic 90-99. Hypertension Stage 2: Systolic 160 or higher or Diastolic 100 or higher (Papadakis et al., 2014).

Microalbumin urine: Microalbumin urine is a blood protein (albumin) found in the urine (McPhee, & Rabow, 2014). A value less than 30 mg is normal. Values greater than 30 to 300 mg indicates early kidney disease (Goldhaber et al. 2009).

Assumptions, Limitations and Delimitations

Assumptions

It was assumed that patients with Type II diabetes and CKD do not have the knowledge to self-manage their disease process or symptoms of their chronic disease. The second assumption was that the patients would want to learn about their illness to be healthier. A third assumption was that with education the patient's knowledge base would increase and pertain more to their chronic disease, specifically renal complications, thus increasing their eGFR. The fourth assumption was that improved knowledge levels would lead to a changed lifestyle for the patient with Type II Diabetes and CKD, and from the change would improve health outcomes. The fifth assumption was that comprehensive patient teaching related to the patient's health processes and needs would increase the patient's health literacy level.

Limitations

A limitation was of financial resources for patients, as patients had to pay for many the laboratory tests, and if they could not afford the tests then the laboratory evaluation would not be completed. However, patients with no income qualified for the sliding scale program which assisted them with the cost of the diagnostic testing (The Helping Hands Board, 2015). Providing a sliding scale service increased the time to register patients into the program. One way to avoid the extra time needed to register patients was to register the patients prior to enrolling in the project**.**

Another limitation was noncompliance with prescribed medication or other health treatments, a widely-acknowledged problem for the low-income population with poor health literacy. To improve compliance with prescribed regimens, the patient was included in the decision-making process. The patient was supported by the health provider when the patient made decisions regarding their health care. Once the patient felt the support of the health provider, the patient gained more confidence making health decisions, and was more interactive in his/her health. In the teaching phase, the patient could make choices on diet and exercise and was able to show their progress to the health provider. Allowing the patient to be engaged in his/her care encouraged discussion about changes in health care they wanted (Rosner, 2006).

Delimitation

A delimitation was the time required for the level of eGFR to increase. The time frame for eGFR to increase in the project was within a month or less (Patel et al., 2012). The eGFR disclosed the status and stage of kidney disease as a lower eGFR designates a

higher stage of kidney disease (Ricardo et al., 2014). The time allowed for eGFR reversal was the same for each patient, which provided a constant timeframe for each patient. An additional delimitation was the possibility that the patient did not return for necessary clinic visits to obtain the education and diagnostic testing. These visits were important for the evaluation of the patient's health and implementation of the project. To avoid missed clinic visits, telephone calls were made prior to each visit to remind the patient, and any missed visits were rescheduled as soon as possible.

Summary

Determining a patient's health literacy was the first step in treating a chronic disease to help the patient realize the extent of his/her disease process and let the patient determine how much he/she would take part in the healing process. Understanding a patient's level of health literacy helped the health provider know how much the patient understands about their disease process. Health literacy is an essential part of healthcare. The realization that health literacy was important, facilitated with the education of the patient, helped ensure that the patient understood his/her disease process. The early diagnosis and treatment of low eGFR remains imperative to decreasing renal disease, and a timely diagnosis, along with patient understanding, increases the effectiveness of treatment and improves health outcomes, as shown with a decreased eGFR, a lowered A1C and weight loss.

Section 2: Review of Literature and Theoretical and Conceptual Framework

Introduction

Section 2 will present the development of information and the different results obtained from each study which portrays the major issues that stimulate ideas. The information presented enhanced the project by offering varied material and different insights about health literacy. Section 2 presents a specific and general literature review, as well as the framework, the logic model (Cooksy & Kelly, 2001), which assisted with the assessment of measurable indicators in the project. The logic model evaluated the baseline data at the beginning of a project and outcomes at the end of a project. The logic model also pinpointed what information is important for the project.

The first step in designing the project was to conduct a systematic review of the literature to provide the evidence to support the project. The Cumulative Index to Nursing and Allied Health (CINAHL), ProQuest Nursing and Allied Health Source, PubMed, the Cochrane Library, and Medline were used to locate evidence for the project. Literature searched included current, peer-reviewed literature and national health initiatives. Key search terms used were *health literacy*, *mean glomerular filtration rate,* and *kidney function*. The limits were set with language (English), *adult, human,* and. I examined and synthesized these terms from previous studies and provided a stronger background and justification for the initiative. Using evidenced based research was paramount to initiate answering a question in a scholarly project (Terry, 2015).

Specific Literature

The purpose of this section was to develop information and present the different results I obtained from each study which portrayed the major issues that stimulated ideas. The literature search located two topics concentrated in the literature research findings. Two topics searched in the literature were health literacy and diagnostic markers as related to patients diagnosed with diabetes. The specific literature sections were organized according to the two topic areas. An additional topic discussed was diabetic nephrology due to the importance of this disease process to the project.

Health Literacy

Health literacy is the capability of patient's ability to attain, process, and understand basic health information and services needed to make correct health choices (The Institute of Medicine, 2009). A decreased health literacy negatively affects people's capacity to navigate the healthcare organization, including filling out intricate forms and finding health providers and services (The Institute of Medicine, 2009). People with limited health literacy often have an absence of understanding or have a distorted knowledge about the body including the nature and causes of disease (The Institute of Medicine, 2009). The summary by The Institute of Medicine, (2009) described health literacy as one of the objectives of Healthy People (2010). The objective of health literacy was not totally fulfilled and was being adapted to Healthy people (2020) in the topic heading of Health Communication and Health Information (Office of Disease Prevention and Health Promotion [ODPHP], 2016).

The Institute of Medicine (2009) discussed the importance of the causal paths among inadequate health literacy and health outcomes. Methodological principals are needed for a comprehensive measurement of health literacy. With these measurements, health care professionals are made aware of a patient's aptitude to read or comprehend instructions and can use this information to create personalized healthcare for the individual patient (Institute of Medicine, 2009). The article was instrumental in increasing my awareness of health literacy and helping to formulate the question for the quality improvement project.

Sand-Jecklin and Coyle (2014) provided beginning evidence for the validity and reliability of a new health literacy assessment tool, the BHLS. One hundred patients were examined, completed the BHLS, the Test of Functional Health Literacy in Adults (TOFHA) short form, and answered questions concerning the two tools. The results indicated that the patients rated the BHLS less difficult to use than the TOFHLA. The Test of Functional Health Literacy Assessment (TOFHLA) assessed a patient's level of comprehension of health-related material. It was available in a full-format with a 22-minute test, and with 50 reading comprehension objects in three passages and 17 numeracy items findings (Parker, Baker, Williams, & Nurss, 1995). The TOFHA was a well thought out instrument for measuring health literacy, but is time consuming to administer in a clinic setting and was not a good fit for the project. An article detailing the BHLS described the instrument as a potentially competent, operational, and patient-friendly screening tool for health literacy (Sand-Jecklin & Coyle, 2014). The BHLS tool has been validated for use in outpatient clinics and emergency department settings.

The scoring on the BHLS tool scoring contains three items on a five-point response scale, read aloud to participants. Each item scored on the BHLS addresses confidence with forms, verbal instruction, and understanding of health treatments (Wallston et al., 2014). The responses pertaining to the BHLS are scored between three and 15, with higher scores equal to or above 19, indicating higher subjective health literacy (Wallston et al., 2014). The study was important because it provided a reliable tool to measure health literacy in a clinic setting. In relation to the project, the BHLS tool was the main instrument used in the project initiative to assess health literacy.

Ricardo et al., (2014) conducted a cross-sectional study to evaluate the affiliation of limited health literacy with kidney function and cardiovascular disease (CVD) risk factors. The study investigated 2,340 non-Hispanic Whites and Blacks aged 21 - 74 years with mild-to-moderate CKD. Assessment of limited health literacy was elucidated in a Short Test of Functional Health Literacy in Adults (STOFHLA) with a score of less than 22 (citation).

The outcomes assessed included eGFR, 24-hour urine protein excretion, and CVD risk factors. The study showed a significant association of limited health literacy with increased level of kidney disease with patients who have CVD (Ricardo et al., 2014). The researchers emphasized the need for more studies to evaluate health literacy as a predictor of clinical outcomes in patients with CKD (Ricardo et al., 2014). The study is important in relation to this project in that this study provided evidence that educational attainment may not be an indicator of a patient's health literacy. A more beneficial

evaluation was addressing functional useful health literacy which provided a more complete evaluation of a patient's understanding of medications and health interventions.

Powell, Hill, and Clancy (2007) had patients with Type II diabetes undergo diagnostic testing with the Rapid Estimate of Adult literacy in Medicine (REALM), the Diabetes Knowledge Test (DKT), and the Diabetes Health Belief Model Scale (DHBM) to assess the association between patient's willingness to take care of their health, or not, and assessed their knowledge about their diabetes. The study presented the problem of health literacy in Type II diabetes as incomparably connected with inferior glycemic control and lesser disease knowledge in patients (Powell et al., 2007). Powell et al., provided convincing information that applying health literacy to the disease process of Type II diabetes would improve outcomes. The article supports the proposed projects, as the article presented increased health literacy increased patient's willingness to manage their disease (Powell et al., 2007).

Diagnostic Markers

Smith et al. (2012) used qualitative methods with structured interviews among primary care physicians, nurse practitioners and physician assistants to examine how clinicians used estimated eGFR in clinical decision making. The study also examined eGFR issues concerning patient communication, barriers to the use of eGFR, and suggestions to improve the clinical usefulness of eGFR. The study highlighted the importance of eGFR as a factor in assessment of kidney status along with creatinine levels plus as a signal to alert patients to recognize early kidney problems. Although the

results showed favorable views of the value of eGFR, clinicians have not replaced the eGFR with serum creatinine to guide their clinical decision making (Smith et al., 2012)

Study recommendations included that more education be provided to clinicians to increase their awareness of how eGFR can be used to evaluate CKD. Early evaluation of the eGFR precipitated early treatment and reversal of CKD. The study was important in the acknowledgment of how eGFR could be used in early evaluation and treatment of CKD and how readings of eGFR could be misunderstood and misused. Accumulating knowledge to assess kidney function helped patients in the self-management of their health care and increased their health literacy concerning renal function and disease. Jansen et al. (2013) investigated the irregularity of illness and treatment perceptions that have been associated with CKD and patient outcomes by analyzing changes in the perceptions of patients who were experiencing predialysis, peritoneal dialysis, and hemodialysis. Each patient identified more perceptions of illness with each procedure. The sample consisted of 105 predialysis patients and 161 dialysis patients (Jansen et al., 2013).

Information was analyzed using multivariate repeated measurements, analyses, controlled for background characteristics, and recurrent methods (Jansen et al., 2013). (citation). Results showed patients on hemodialysis professed more illness concerns than pre-dialysis patients and those patients undergoing peritoneal dialysis (Jansen et al., 2013). Findings also suggested that illness and treatment perceptions differ according to pharmacotherapy and diet treatments used to slow the progression of kidney disease and prevent complications and comorbid conditions (Jansen et al., 2013). The study provided

an explanation for different behavioral and emotional responses to chronic kidney disease, and clarified that patients make sense of health warnings by reinforcing their own reasoning and emotional perceptions of a health threats (Jansen et al., 2013). These perceptions guide coping behaviors which, in turn, define outcomes and quality of life (Jansen et al., 2013). The study was important as it gives a different insight as to how patients perceive their treatment in CKD, and it allows a broader understanding of how patients perceive their illness. In relation to the project, the results were encouraging, providing evidence that perceptions are acquiescent to stimuluses, meaning that information and education would be helpful in impacting illness and treatment perceptions to improve accompanying outcomes.

Diabetes and Nephropathy

Diabetic nephropathy is a clinical condition manifested by persistent albuminuria 300 mg/d that is established in at least two instances 3-6 months apart with a progressive decline in the eGFR (Thomas & Karalliedde, 2015). The three major histologic variations that occurred in the glomeruli as the diabetic nephropathy progressed were a mesangial expansion induced by hyperglycemia, then coagulating of the glomerular basement membrane, and lastly glomerular sclerosis (Thomas & Karalliedde, 2015).

Another complication to the renal hemodynamic changes holds that patients will become hypertensive, and the increased systolic blood pressure will further exacerbate the CKD to proteinuria and then decline the glomerular filtration rate, leading to end stage renal failure (Thomas & Karalliedde, 2015). The information depicting nephropathy was important in describing details and general pathophysiology in the development of

CKD. Specific information and facts about nephropathy helped the project by promoting understanding relating to the progression of CKD and what each patient may confront.

Diabetic nephropathy predicts end-stage renal failure cardiovascular morbidity and mortality, and total mortality (Oxford University, 2011). Preventing or delaying the development of microalbuminuria is a fundamental treatment goal for renal and cardio protection (Oxford University, 2011). The risk factors for diabetic nephropathy are hyperglycemia, hypertension, smoking, genetic predisposition, male gender, and increased cholesterol/triglyceride levels. The importance of patient education to reduce these risk factors and avoid diabetic nephropathy was imperative. Patient education and involvement was necessary to stop the progression of diabetic nephropathy. Early detection of microalbuminuria assisted in the early treatment of glycemic control and decrease adverse effects.

Controlling hypertension has been easily done with the use of angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin receptor blockers (Oxford University, 2011). The use of ACEIs and angiotensin receptor blockers (ARBs) potentiated the dilatation of the renal afferent arterioles, reduced intraglomerular hypertension and reduced proteinuria (Oxford University, 2011). In the treatment of diabetic nephropathy, the empowerment of patients cannot be overstated. Patients with the appropriate knowledge and skill to manage and control diabetes and diabetic nephropathy increased their quality of life and improved their health outcomes (Oxford University, 2011). The realization of how important the role the patient plays in the treatment of diabetic nephropathy was instrumental to the project by showing how

important educating patients with diabetes about treatment of their diabetic nephropathy. For the project, the information on patient involvement in diabetic nephropathy confirmed that the education of the patient was significant but finding the appropriate strategies to achieve the goal was the key therapy.

General Literature

Health Literacy

Baker (2006) deliberated that health literacy was an exciting point of research. The article presented different perceptions of health literacy as being the constellation of skills, individual capacities, the ability to use health information efficiently, and the ability to function in a health environment (Baker, 2006). However, health literacy was also dependent on the health care system and within the health care system is where health literacy makes a big impact on the care of a patient. Baker (2006) states “that health literacy is a dynamic state of an individual during a health care encounter” (p. 878). Health literacy was designated as a conceptual model addressing the patient’s ability to understand the spoken and written health instruction. The patient using these skills adequately made their way through health treatments effectively.

Baker (2006) discussed several instruments that measure health literacy, including the Rapid Estimate of Adult Literacy in Medicine (REALM), the TOFHA, and the Health Activities Literacy Scale (HALS), and the Newest Vital Sign (NVS). In line with TOFHA, a variation of the instrument is the Self-Reported Functional Health Literacy (S-TOFHA) which focuses on limited reading skills of a patient not using a surrogate reader. These instruments are noted to be, “good measures of an individual’s reading ability”

(Baker, 2006, p. 880). However, comprehensive measures of health literacy are still needed. Baker (2006) proposes the concept that just because a conversation of health has occurred between the patient and health provider does not mean there was communication. The information gained shows the impact health literacy has on health outcomes which was very important in relation to the project.

Rak (2014) noted that low health literacy was fundamentally related to adverse health outcomes. Specifically, the research pinpoints Diabetes management self-efficacy with employed patients. Although no association was found between health literacy and employment, there was an incidental link to employment and healthiness or lack of controlling Diabetes. The article implies that increased health literacy will improve self-efficacy and health employment outcomes (Rak, 2014). The importance of health literacy in diabetes and how it affects the life of a patient with diabetes was highlighted. The article helped me to understand how important it is to manage diabetes and to prevent major adverse and unsafe outcomes in the health of a patient.

Di**agnostic Markers**

Baines (2008) presented different management choices for glomerular disease that can be encountered in clinical practice when Diabetes Mellitus was the secondary cause of glomerular disease. The article specified to diagnose kidney disease with simple tests such as urinalysis and blood pressure check, urea, electrolytes, full blood count, and C-reactive protein (Baines, 2008).

However, there was a large overlap between the early analysis of glomerular disease and acute kidney injury. Glomerular disease and CKD were suspect with a falling

glomerular filtration rate (eGFR) and should be ruled out. The information gained concerning glomerular disease showed the significance of a decreasing eGFR and increasing serum creatinine which are chief indicators of kidney insufficiency, and were important in the evaluation of kidney function.

A clinical guideline developed by the American Diabetes Association (2013) focused on the standards of care for patients with Diabetes and identified screening, diagnostic, and therapeutic recommendations. The guidelines recommend testing be completed for Diabetes in overweight individuals with a body mass index (BMI) greater than 30 kg/m2, and with a family history of Diabetes, or race/ethnicity of Native American, African American, Latino, Asian-American, and Pacific Islander. Included in the recommendations for screening were individuals with insulin resistance. The CKD treatment guidelines could be used for any chronic disease with signs CKD (Table 2). A cohort study by Allen et al., (2011) found successful use of electronic health record data enabled risk stratification of patients and recognized gaps in quality of care. Increasing physician acknowledgment of CKD and participation in kidney disease monitoring and co-management of patients with stages 3 and 4 CKD by nephrologists signified achievements that improved the delivery of CKD treatments (Allen et al). Single most leading cause of end-stage renal disease (ESRD).

Table 1

The Clinical Guidelines for Chronic Kidney Disease (CKD)

Symptoms	**Referrals**	**Treatment**
Heavy Proteinuria	Referral to Nephrology	Adjustment of Medications
Abnormal Renal by Ultrasound	Referral to Nephrology	Adjustment of Medications
Screening for CKD	Monitoring. For CKD	Treatments
Yearly monitoring	Monitoring hemoglobin, electrolytes, bicarbonate	Monitoring Calcium phosphorus parathyroid hormone
Bone Density testing	Vitamin D	Dietary
Monitoring eGFR	Every three months	Observing Albumin.
Monitoring of creatinine	Every three months	Monitoring Potassium

Note. from the American Diabetes Association, 2013.

The major point of the guidelines for the treatment of CKD was that diabetes was the single most leading cause of end-stage renal disease (ESRD). The clinical guidelines provided management suggestions for CKD and included specific recommendations for patients with diabetes. Diabetic patients are at major risk for CKD due to the major stress that hyperglycemia puts on kidneys. In relation to the project, the emphasis would be on preserving kidney function and this entailed constant surveillance of the kidneys in the patient with diabetes.

Summary

The literature review provided information about the importance of using the eGFR in guiding clinical treatments. In general, the information described a lack of perceptiveness in patients concerning their illness, which predisposed them to be noncompliant to health treatments. Health Literacy is an important indicator of a patient's knowledge about their illness and how it affects their compliance. The literature also highlighted that kidney disease was prevalent in patients with diabetes, and frequent monitoring and timely treatment was important to avoid adverse effects. Health literacy would directly affect a patient's health, and low health literacy was fundamentally related to adverse health outcomes. The literature review provided evidence-based practices and information that directed the project initiative to assess empirically the structure and methods to achieve the objectives of the project.

Conceptual Framework

The purpose of the logic model was to illustrate the order of events that classified project resources, match resources to needs, stimulate the service process, complete the service process, and measure the results (Kettner, Moroney& Lawrence, 2013). A logic model was a tool used to evaluate the information and the format of a project (Yampolskaya et al., 2004). Using the model logic assisted in effective planning, implementation, and evaluation of the program (Yampolskaya et al., 2004). The logic model as a framework established the project's activities (processes) which required resources (inputs) to do the activities (Yampolskaya et al., 2004). The outputs are the product of the inputs of the model. The advantages of the use of the logic model was it displayed the project's activities and outcomes, and facilitated the assessment of the process of the program (Figure 2).

The key stakeholders in the project were the patients and health providers. The concepts were health literacy and the health care for diabetes and renal care. The approach was the assessment of health literacy to know which patients needed education to improve their understanding of their health process. The logic model assisted in recognizing underlying assumptions, and emphasizes the processes and organizations of change (Erwin et.al, 2016).

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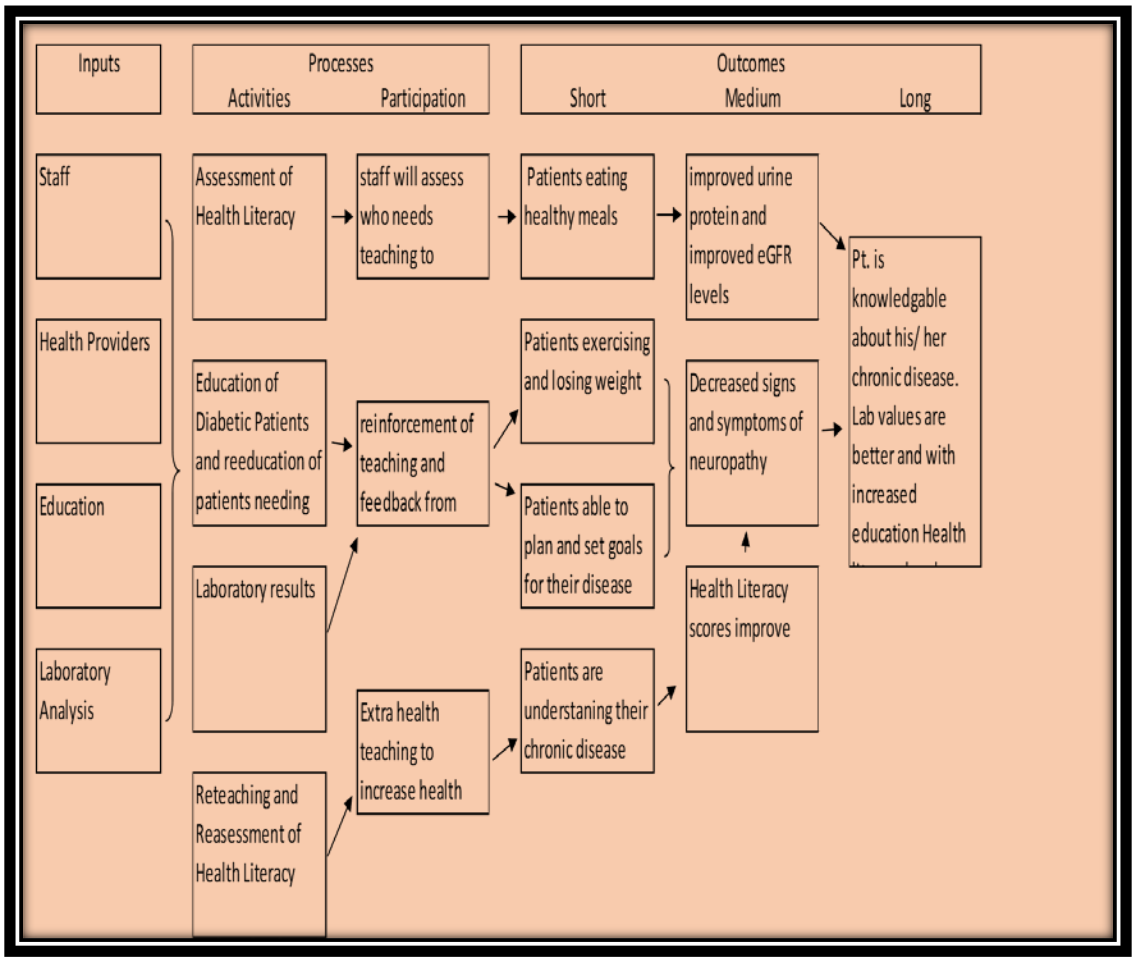

Figure 3. The Logic Model. The model shown was utilized in the DNP project.

The logic model established a logical sequence and clarified program goals, individual components, and how specific activities fit together to produced desired outcomes (Cooksy & Kelly, 2001). The assumptions of the logic model included clear communication would increase learning and that learning would increase the health literacy of the patient. The processes were the education of the patient and the management of diabetes along with renal care. The inputs were the resources that would be used to help

the patients, and included the staff of the clinic, and the necessary equipment used to manage the patients' care. The outputs were the results of the care given to the patients and included the laboratory values of eGFR, the microalbumin test and blood glucose levels, as well as the measured level of their health literacy. The microalbumin test and the eGFR are important indicators of outcomes of early end-stage renal disease (Uphold & Graham, 2013). A better understanding of patient's chronic disease would help the patient comprehend which interventions are necessary for improved outcomes.

Summary

Section two provided a literature review offering an overview of significant literature on health literacy and the importance of knowing and improving health literacy in patients with chronic diseases portraying decreasing eGFR. The section depicted the importance of identifying decreased eGFR promptly to reverse or prevent kidney dysfunction. Increased health literacy provided an individual with the understanding of the process of his/ her illness and management of their health, additionally how health literacy can impact the relationship between the health provider and the patient either negatively or positively. Furthermore, the section discussed how low heath literacy increases emergency room admissions and decreases preventative health and overall health costs. The logic model was used to provide a framework for the DNP project and summarized the significance of the utilization of the model. Overall, the section provided detailed information essential to distinguish the importance of such a project and how it would impact the lives of patients with low health literacy.

Introduction

Increased health literacy is one of the many factors that help people follow health regimes and understand their health. diabetes is a chronic disease that has many adverse effects that could lead to kidney failure if patient does not contribute in his care. The project has a methodology of a nonexperimental design that uses quantitative correlation analysis to examine differences between patients with diabetes who had low health literacy. The project sought to determine whether health education increases health literacy and how it impacts patients showing decreased low eGFR after education. Information of this type could help health providers improve health outcomes in patients with low eGFR in patients with diabetes. In Section 3 I will discuss the project design, the target population, and the setting. The section will also describe the data collection, instrumentation, human subjects and the data analysis.

Project Design/Method

The project used a correlational prospective design to determine if increasing the health literacy of patients with diabetes improved their eGFR. The project entailed selecting patients with diabetes and with low eGFR then assessing their health literacy. The intervention was to increase the health literacy of the patients with diabetes who have a low eGFR using an educational process. The goal of the educational intervention was to increase their health literacy and potentially increase the patient's health outcomes. Health literacy was measured using the BHLS instrument and the score was correlated with the improving diagnostic markers. The diagnostic markers were the fasting glucose, Hgb, A1c, and microalbumin urine.

Population and Sampling

Setting

The setting was a nonprofit clinic in a small suburb of Dallas, Texas. The clinic employs two nurse practitioners and the medical advisor is a physician who volunteers once a month. The clinic sees approximately 7,450 patients a year of all ages, including military veterans (Helping Hand Board Report, 2015). The clinic serves a population of 3% Asian, 6% African American, 38% Hispanics and 49% Caucasian, with 60% of the patients being below the 200% poverty level and on the sliding scale program of the clinic (Helping Hand Board Report, 2015). Most families seen at the clinic are not college educated, and the biggest majority does not have a high school education (Helping Hand Board Report, 2015). Well visits were done for children, women, men, and adolescents regularly, as well as visit to a wide variety chronic and acute illnesses. The clinic offers immunizations, laboratory analysis, and simple procedures such as toenail removal, joint injections, abscess incision and drainage, wound care, and therapeutic injections (Helping Hand Board Report, 2015).

Target Population

The target population was composed of patients between the ages of 20-65 years who have diabetes with an eGFR less than 60 (mL/min/1.73). The sample includes Hispanic, Caucasian, African-American or Asian patients from the clinic who have had diabetes for 2 years or longer. The time frame of 2 years or longer was important because this type of patient was not a novice to diabetes and could start to learn about taking care of the kidneys without being overwhelmed with learning about being newly diagnosed

with diabetes. Exclusion criteria included patients younger than 20 years of age as they would require pediatric specialty care. The project initiative also excluded patients who are over 65 years of age as Medicare only pays once a year for many of the tests needed for the analysis in the project.

Data Collection

The participant's initial visit consisted of a physical assessment, laboratory analysis including the complete metabolic panel (CMP), Hgb A1c, fasting glucose finger stick, microalbumin urine, and documentation of current medications. At the initial visit, the BHLS instrument was given to the participant to assess his/her level of health literacy.

During the first week visit, after obtaining the participant's health literacy level, education was provided (Appendix A). The teaching materials were at a sixth-grade reading level to reach all those at that reading level or above. Research states that low literacy was documented at a sixth-grade reading level or below the level (Schillinger, et. al, 2003). A sixth-grade reading level of information along with simplified pictures will reach a higher degree of responsiveness and acceptability in a population with a varied literacy (Schillinger, et. al, 2003).

The education given to the participants consisted of diet, medication, and instruction in managing his/her chronic disease that would be most beneficial to the kidneys. The education included a discussion of how over the counter medications are toxic to the kidneys and identification of the ingredients in drinks and foods that could negatively impact kidney function. The educational presentation helped to make the

participants more aware of how the kidneys function and the ways to help the kidneys work more effectively.

After the education process, the participants were given a handout and were asked to give feedback on the educational content to ensure that the participants understood the information and there was an answer and question session for the participants. In the second week, the participants returned to the clinic for a fasting glucose finger stick, vital signs, and a review of the education given. The participants were questioned on his/her understanding of the education previously given, and the education was reviewed again with the participant. Then the participants were encouraged to ask questions. In the third week of the protocol, the participant returned for another evaluation of the fasting glucose level and vital signs plus a review of education and question and answer period. In the fourth week, the participant had his/her health literacy retested using the BHLS and the diagnostic tests microalbumin urine, CMP, Hbg, A1c, and fasting glucose finger stick was redrawn. After gathering the diagnostic measures, the participants were asked to fill out a short evaluation form at the end of the project detailing their progress in managing their disease (Appendix B). The results from the evaluation form indicated that participants believed that they gained necessary knowledge from participating in the project.

Instruments

Brief Health Literacy Screen (BHLS) Tool

The BHLS tool was designed to measure written and verbal health literacy (Sand-Jecklin & Coyle, 2014) (Appendix C). The content was read to patients and was

perceived less test-like by patients (Sand-Jecklin & Coyle, 2014). The BHLS has an internal consistency of 0.79, which was significant since the tool consists of only five questions (Sand-Jecklin & Coyle, 2014). To administer and score the BHLS test took approximately two to three minutes, so it is efficient for use in a busy clinic or hospital (Sand-Jecklin & Coyle, 2014). Any questions on the BHLS that displayed a score of three or less pinpointed an area that a patient needs extra health information or instruction (Sand-Jecklin & Coyle, 2014).

Wallston, Cawthon, Rothman, Osorn, and Kripalani, (2013) assessed the BHLS by using registered nursing and research assistants to evaluate the psychometric properties of the BHLS to validate the psychometric properties of the BHLS. The results showed nurses in both clinic and hospital settings could improve their patient's understanding of their health and improve patient compliance with medications, treatments and health outcomes (Wallston, Cathon, Rothman, Osborn & Kripalani, 2013). Cronbach's alpha for the BHLS-RN was 0.80 among hospital patients (N=498) and 0.76 among clinic patients (N=295), indicating high internal consistency reliability. Interclasscorrelation between the BHLS-RN and BHLS-RA among clinic patients was 0.77 (95 % CI 0.71–0.82) and 0.49 (95 % CI 0.40–0.58) among hospital patients (Wallston et al. ,2013) BHLS-RN scores correlated significantly with BHLS-RA scores (r=0.33 among hospital patients; r=0.62 among clinic patients), and with S-TOFHLA scores (r=0.35 among both hospital and clinic patients), provided evidence of inter-administrator reliability and concurrent validity (Wallston, et al, 2013).

Protection of Human Subjects

The project did not pose any threat to patients and was not a greater than minimal risk project. Upon approval from the Institutional Review Board at Walden University, the project was initiated. The participants were current patients of the health provider, who conducted the project. The American Nurses Association (2011) noted data collected is anonymous in which there is the protection of the privacy and confidentiality for the patients. Nurses must protect subjects from any peril especially concerning privacy, autonomy, confidentiality, and fair treatment (Grove, Burns, & Gray, 2013).

The participants in this project initiative have had informed consent, and the risks and benefits explained, along with their right to withdraw from the project initiative at any time (Grove, Burns, & Gray 2013). The clinic has granted permission to allow this student to use the facility to complete the project initiative (Appendix E). The data collected had been kept on a computer that had been password protected and in a code book with identification numbers for the participants that de-identifies them. Hardcopies of the data were kept locked in the office of the clinical manager. Demographic data was made available in the patient's chart and has been protected to preserve the privacy and the confidentiality of the patients. All the benefits of the project initiative outweigh any jeopardies posed to the subjects (Grove, Burns, & Gray, 2013).

Anticipated benefits

The participants could assess numerous benefits such as better communication with their health provider, enhanced understanding of their health with more self-efficacy and an improved quality of life, which would lead to the patient impacting his/her health

quality. Also, the participant would have a tighter controlled diabetes with improved glucose control and improved kidney function as indicated by an increased eGFR. In completing the project, the anticipation is that the participants will feel better about themselves and their health with the completion of the project.

Potential risks.

The project itself does not pose any risk to the participant. The participant was in the clinic for treatment of a chronic illness, which would be taken care of whether the participant was in the scholarly project or not. The project would only enhance the understanding of the chronic illness and bring about better care toward his/her chronic disease by the participant.

Data Analysis

The question for this project initiative is, "How does health literacy affect the low estimated glomerular filtration rates in patients with diabetes?" All data for this project were anonymous and were entered a Med-Cal database. The Med-Cal Package for the Biomedical Sciences version 16.1 statistical program was used for all analyses. The Correlation analysis was used to draw a relationship between the variables of health literacy as measured by the BHLS, eGFR, A1C, and microalbumin urine. Correlational analysis was used to examine the relationship between the education given to the patients and health literacy. Also, a relationship between the health diagnostic markers and health literacy was examined using Pearson's correlation coefficient.

Project Evaluation

The goal of the project initiative was to increase the health literacy in the population of patients with diabetes showing a decreasing eGFR. The evaluation of the program examined the impact of the program and its potential in the future (Kettner, Moroney, & Martin, 2013). The program was evaluated by the response of the patient to the education component, with an evaluation of their health literacy and their adherence to the four-week protocol. The evaluation of the project also involved a comparison of the diagnostic tests and BHLS before and after the four-week intervention to determine if the project was successful in helping the participant improve his/her diagnostic markers and health literacy.

Summary

The approach for the project was nonexperimental. The prospective design was correlational analysis to determine if increasing the health literacy of patients with diabetes and low eGFR would assist the patient in understanding his/her health process and improve self-efficacy. The target population is composed of patients between the ages of 20-65 years who have diabetes type 2 with a eGFR less than 60 (mL/min/1.73). Health literacy was measured at the beginning of the project using the BHLS instrument and the score was correlated with the diagnostic markers. The diagnostic markers are the Hgb, A1c, fasting glucose and micro albumin urine.

The project initiative entailed four weeks of assessment and education to patients with diabetes and low eGFR. The fourth week of the project included another assessment of health literacy with comparison of the health literacy assessment done in the first

week. The project examined diabetes and how low health literacy can affect eGFR. The project also observed how increasing the health literacy affects the patient's health and the health outcome.

Section 4: Discussion and Implications

Introduction

Section 4 discusses the summary of outcomes of a DNP project evaluating the association of health literacy with eGFR. The DNP project used the health literacy assessment to increase the participant's knowledge base of their diabetes and eliminate or decrease adverse effects of renal dysfunction. Participants (n=30) were evaluated for health literacy and the status of their diabetes through evaluating diagnostic laboratory values and obtaining a physical assessment, following the clinical guidelines developed by the American Diabetes Association (2013) over a 4-week period. Section 4 summarizes the results of the DNP project, the conceptual framework, suggestions for use in practice, social implications, analysis of self, and strengths and weaknesses of the project.

Summary and Evaluation of Findings

The DNP project's primary purpose was to assist patients in self-efficacy in their knowledge, maintenance, and prevention of kidney disease. Each of the 30 participants had signs of kidney dysfunction as indicated by a decreasing eGFR. Statistical analysis was completed using MedCalc Statistical Software version 17.0.4 (MedCalc Software; https://www.medcalc.org; 2017) for independent two-sample t-tests and correlation coefficients.

Patient care followed the American Diabetes Association's guidelines (2013). Patient care also provided the diagnostic laboratory tests to assess the status of renal function of participants. The project consisted of three objectives. The first objective was

to measure the health literacy of the patient with Type II diabetes who was demonstrating signs of CKD. The BHLS measured health literacy in patients (Figure 3).

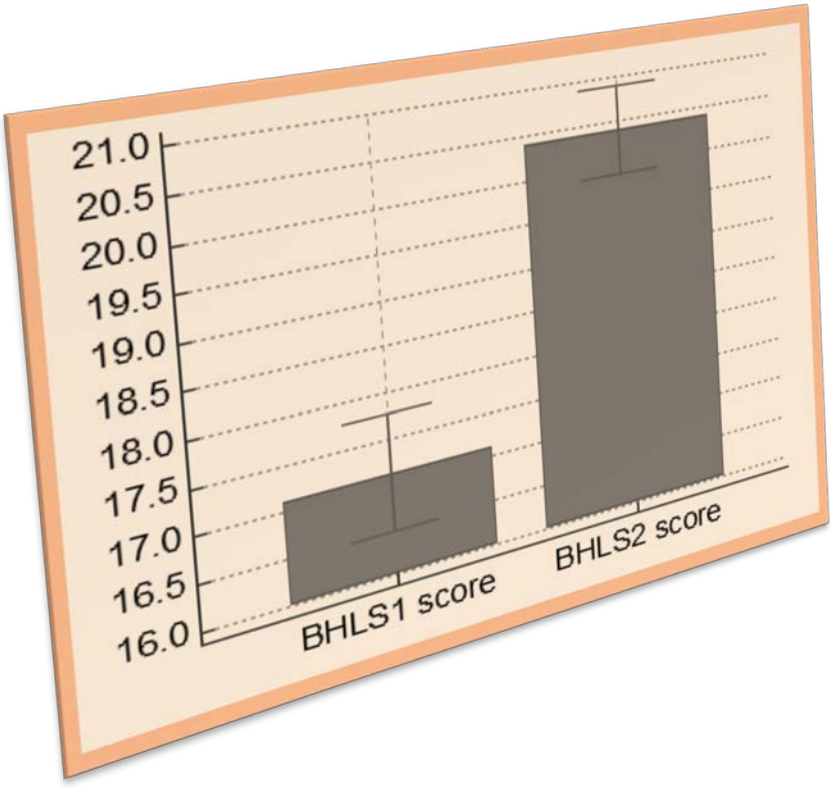

Figure 4. Mean scores of health literacy from the (BHLS. The scores are shown before participant education (BHLS1) and after participant education (BHLS2) measuring literacy. *n*=33.

Health literacy is considered high at a score of 19 or above. Total possible score was 21. The mean health literacy scores of participants before patient education were 17.2. The participants completed the BHLS test in Week 1 of the project and again in Week 4. The mean scores of the BHLS2 test increased to 20.4. The mean scores increased 4.2 points after the four weeks of patient education. Two-sampled *t*-tests were used to examine the characteristic between the BHLS1 and BHLS2 (Table 3). The interpretation of the score differences between the BHLS1 and BHLS2 allowed health literate scores to be assigned

to each participant. The two-tailed probability shows that the result for the BHLS1 and BHLS2 samples were significant, and the difference between BHLS1 and BHLS2 scores did not occur by chance. The increase of the BHLS2 scores was significant, demonstrating that the participant's scores were greater after patient education.

Table 2

The statistical analysis of BHLS 1 and 2 scores

Degrees of Freedom (DF)	64
95% CI of Difference	2.4586 to 4.0869
t-test statistic	8.030
Two-tailed probability	*P* = 0.285 E -010

Note. CI= confidence interval.

The t-test showed the significance of mean differences between two comparison groups. The *t* test found significance with the two-tailed probability number being $p < 0.05$ with *t*-distribution = 1.0 and 95% confidence of the critical value 1. 999.

The second objective was to increase health literacy from a low level to a higher level to enable the patient to understand his health needs. Health literacy was measured using the BHLS. Increasing low health literacy was achieved through comprehensive patient teaching related to the patient's health process and needs. The results on the BHLS2 demonstrated improved health literacy by the increased scores of the BHLS2.

The improvement of diagnostic health markers indicated that the participant complied with medication and health treatments to improve his/her health. The improvement of the diagnostic laboratory values verified that the patient understood his/her chronic disease and achieved his/her health goals to improve wellbeing. The glucose values, prepatent education, and post education are shown in Figure 4 as Glucose 1 and Glucose 2 respectively.

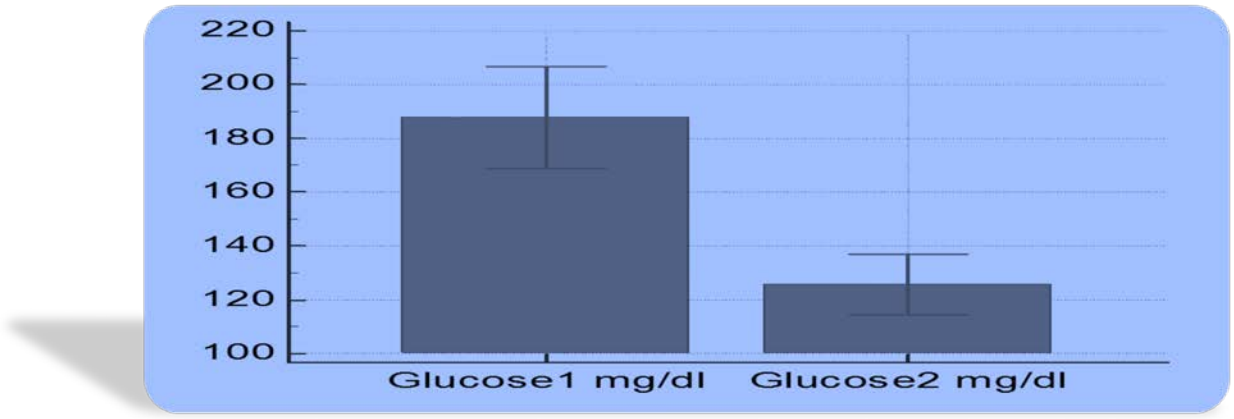

Figure 5. Comparison of Glucose 1 and Glucose 2 mean values. Mg/dl =mg of glucose per deciliter of blood. With education, Glucose 2 presented lower fasting glucose.

The mean for Glucose 1 is 185 mg/dl, a high value for a fasting patient with diabetes. A fasting blood glucose for a patient with diabetes should be below 125 mg/dl (Ricardo et al., 2014). After 4 weeks in the project and after patient education related to dietary changes and medication compliance, the mean glucose decreased to 122 mg/dl. The Glucose 2 sample showed a moderate decrease in glucose averages in 4 weeks,

indicating that participants adhered to the regimen resulting in diminished glucose numbers.

Despite the fact that the Glucose 2 changed in 4 weeks, there were no discernable changes in micro albumin urine or Hgb A1c results. Rak (2014) noted that A1c changes are not obvious until 2-3 months and thus drawing the laboratory value earlier than that will yield no changes. The significance of a reduced fasting glucose for a patient with diabetes is exceptional, as it represents the path towards a sound glycemic index, which affects all areas of a patient's physical health (Ricardo et al., 2014). A fasting glucose that is repeatedly in control is the start of glycemic control (Ricardo et al., 2014).

Two sampled *t*-tests were used to examine the characteristics between Glucose 1 and Glucose 2 (Table 3). The p value of the two-tailed probability shows that the results for Glucose 1 and Glucose 2 samples were significant and that the difference between Glucose 1 and Glucose 2 scores did not occur by chance. Table 3 demonstrates the testing of the significance of the mean differences of the comparison groups Glucose 1 and 2.

Table 3 *Statistical analysis of Glucose 1 and Glucose 2*

Two-tailed probability	P=0.325 E 006
Test Statistic t	-5.702
95% CI of Difference	-83.8027 to -3185
Degrees of Freedom (DF)	64

The *t* test was used to test the significance of mean differences on the glucose values of the participants. The results showed the participants with education could decrease their glucose effectively as shown with a significance $P < 0.05$ with a 95% confidence level of the degrees of freedom and the critical level of the t test at 1.999 with the *t* statistic at -5.702. and the *t* distribution at 1.00.

Included in the assessment process of diagnostic health measures is the evaluation of eGFR, which is important in the appraisal of kidney function of the patient with diabetes. The eGFR, a key diagnostic measure in the project, was observed and evaluated for possible early kidney disease. Figure 5 shows a two-sampled *t*-test of eGFR 1 (before patient education) and eGFR 2 (post patient education). At 4 weeks, there was a noticeable increase of eGFR.

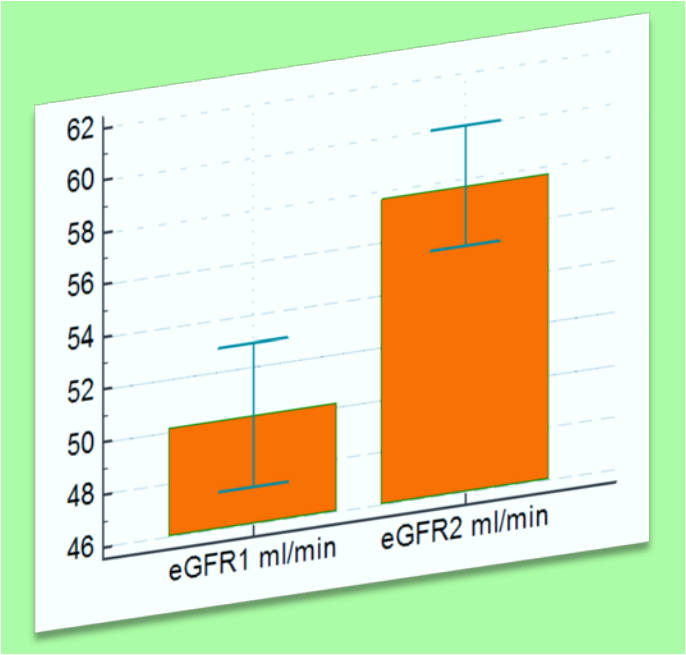

Figure 6. eGFR 1 and eGFR 2 mean flows. eGFR=mean glomerular filtration rate. ml/min= millimeter per minute.

Patient education provided participants' support with their kidney care and subsequently, reversed the low flow eGFR. An increase in the flow of eGFR is regarded as an enhancement of kidney function, and the reversal of eGFR is a sign that kidney function can improve (Ricardo et al, 2014). The two-tailed probability presented a significant number of $p < 0.05$ with a 95% confidence level indicating that the eGFR increased after patient education and did not occur by chance (Table 4). The rise of the eGFR was one of the principal diagnostic tests needed to show improvement of renal function (Ricardo et al., 2014).

Table 4 *Statistical Analysis of eGFR 1 and eGFR 2*

*2*95% CI of difference	4.0062 to 11.0421
Test statistic t	4.279
Degrees of Freedom (DF)	64
Two-tailed probability	*p*= 0 .641 E -004

The findings support the improved flows of eGFR 2 which concur with the statistical significance of the comparison of eGFR 1 and eGFR 2. The *t* statistic of 4.279 and t distribution of 1.000 shows a 95% confidence level with $p < 0.05$. The normal eGFR is 60-96 ml/min (Ricardo et al., 2014). Prior to education, the mean of eGFR was 50 ml/min of the participants. The eGFR in this range places the participants in the category of renal insufficiency (Ricardo et al., 2014). All 30 participants had an increase in eGFR after education.

The third objective asks if health literacy affects the eGFR. The effect of health literacy was demonstrated by improvements in diagnostic markers and eGFR. The health literacy improvement and the improvement of the diagnostic markers indicated a positive effect of increased health literacy. The assessment of the participants identified if the educational intervention increased his/her health literacy. The education did increase the participant's health literacy. The participants could verbalize understanding of the instructions for diet and medications. The participants did show higher scores on their BHLS signifying higher health literacy.

The analysis of the eGFR showed an improvement in heath literacy and how the eGFR positively impacted the other diagnostic markers. Health literacy provided the participants of the project with self-efficacy and the improved eGFR helped the participants to realize their own contributions to their health progression. Figure 6 shows the positive correlation of health literacy (BHLS2) and eGFR (eGFR 2) after patient education.

Below is the statistical correlation of health literacy (BHLS 2) and (eGFR 2). The regression line displayed in Figure 6 matches closely the actual correlation scatterplot in Figure 7. The regression line is the best fit line determined by the calculations computed on the computer showing how the scatterplot should appear with the best possible scenario. The scatterplot shows the correlation exists, but does not show the causation of the correlation (Polit, 2010) The positive correlation answers the question asked by the third objective: “What is the relationship between the health literacy and eGFR?” The scatterplot and statistical analysis of BHLS 2 and eGFR 2 demonstrates that as the health literacy increases so does the eGFR.

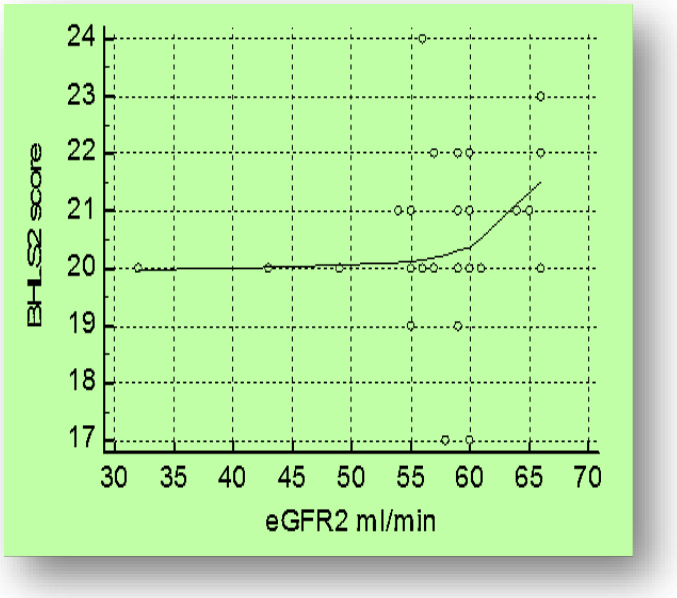

Figure 7. Correlation scatter plot illustrates a moderate positive relationship where the trend is upward and the points fall loosely in a general upward positive direction.

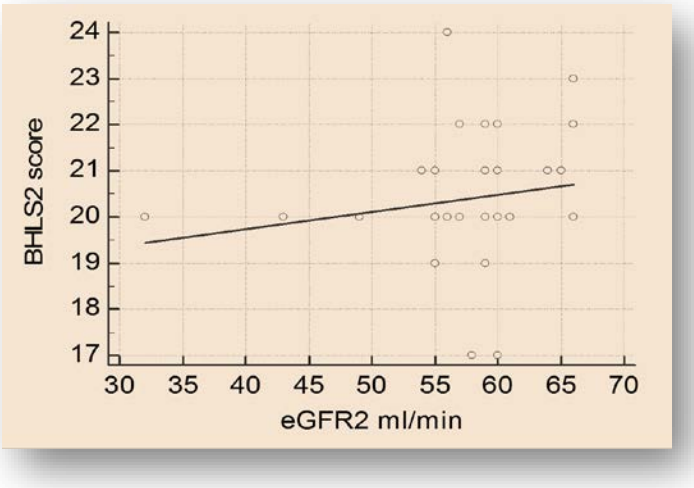

Figure 8. Scatter plot with regression line. The regression line indicates the correlation scatter plot to be valid for the project

Table 5 indicates statistically the correlation shows a positive relationship demonstrating the significance of the positive correlation. The statistical equation validates the correlation between health literacy and eGFR in that they parallel in direction but the correlation does not prove causation (Polit, 2010).

Table 5

Statistical analysis of BHLS2 and e GFR2

F-test for Equal variance	P< 0 20 E-012
T-Test	Assuming equal Variances
95% CI of difference	34.9760 to 39.6301
Test statistic t	32.024
Degrees of freedom	64

Note. p <0.05 with a 95% confidence level of the degrees of freedom and the critical level of the t-test at 1.66 with the t statistic at 32.024 for two tailed testing.

The third objective was fulfilled with the analysis showing a positive relationship between the BHLS2 and the eGFR. Increasing health literacy will not automatically increase the patient's wellbeing, unless the patient is compliant to his/her medical advice and treatments. How this compliance will occur will depend on the relationship between the health provider and the patient. Compliance will only exist if the health provider has a rapport with the patient that the patient can relate to (Baker, 2006).

The DNP project satisfaction survey showed participants were satisfied and had gained practical knowledge from the project. The scale was from 20 to 5, with 20 points equals to very satisfied and 5 points equals to very unsatisfied with the project. The scale continued with 10 points equals to not being happy with the project; and 15 points equals to being satisfied with the project. The graph shows the results of 30 participants being satisfied or very satisfied with the project. The approval scores were ranging in the high scores of 20 with the participants feeling as though they had learned essential points important to their health from participating in the project (Figure 8).

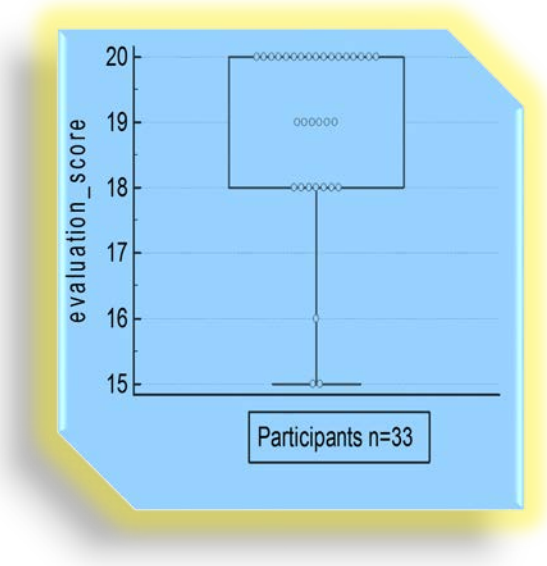

Figure 8. The evaluation scores of participants.

Discussion of findings in the context of literature and frameworks

The literature strongly favors health literacy as a self-motivating state that is needed for patients to understand spoken and written health instructions (Powell et al., 2007). A patient's diabetes improves when the patient is an advocate of their own health and is compliant with health treatments, medications, and diet (Berkman et al., 2010). The project shows health literacy, along with patient education, is associated with greater patient self-efficacy and improvement in diagnostic scores. Diabetes self-efficacy is associated with lower glucose levels, leading to less adverse effects such as renal complications (Powell et al., 2007).

The framework of the logic model represents a method of how a project with

processes work to achieve certain outcomes (Erwin et al., 2016). The primary purpose of the logic model is to provide the participants with education and health management skills and to maintain glycemic control through self-efficacy (Powell et al., 2007). Self-efficacy is important for patients with diabetes, especially for those patients with low health literacy because (King, 2010). The logic model uses guidelines to assist patients in planning programs for their lifestyle that support them in planning health goals for their illness (Erwin et al., 2016).

Early detection facilitates the appropriate diagnosis and treatment of acute and chronic kidney diseases. However, since kidney disease is silent until late in the disease process, it is important that patients participate in their care to protect and care for their kidneys. The patients working together with their health provider can help with early detection of kidney failure. Health literacy is vital for a patient with a chronic disease to maintain health. A baseline health literacy level is important for a health provider to know what to teach a patient what he/she requires maintaining their health. When a patient is receptive a health provider can teach the information, they require, at the level he/she can understand, then the patient could take part in understanding what is needed to manage their health care.

Implications

Policy

Since many of the healthcare provider responsibilities fall on the advanced practice nurse, the nurse practitioner must ensure that the patient is a part of the health care process (Terry, 2015). Many primary care services, such as wellness and prevention

services, use nurse practitioners to diagnose and manage many common, uncomplicated, acute illnesses and chronic diseases such as diabetes (Terry, 2015). The patient can partner with the nurse practitioner and work to maintain the health of the patient. The patient participating in his/her health care can help prevent unnecessary, costly emergency room visits and other added costs of complications of chronic diseases such as neuropathy, amputation, diabetic retinopathy, or renal disease. Many of the indigent have no home base health care, and nurse practitioners are filling the void by working in the clinics that offer primary care to patients without insurance. Primary care for the indigent, with the nurse practitioner as the primary provider, allows for the timely diagnosis of chronic diseases and maintenance care of the chronic diseases to prevent complications.

Practice

Especially in the person diagnosed with diabetes, the decreasing eGFR can be the first and only sign of kidney dysfunction. Thus, it is crucial for patients and health providers to be aware that the eGFR can be reversed. The eGFR is the amount of flow through the glomerular tubules in the renal system (Ricardo et al., 2014). An eGFR of less than 60 ml/min can be the first sign of developing kidney problems (Ricardo et al., 2014). The early reversal of eGFR can stop kidney damage and positively impact a patient's illness. Improvement of eGFR in clinical practice can lead to a better rapport between the patient and health provider, which, for the patient, increases disease awareness, self-care fulfillment, and improved health outcomes (Ricardo et al., 2014). Furthermore, new care plans for health literacy and eGFR are needed to boost health outcomes (Ricardo et al., 2014).

Patient education provided participants' support with their kidney care and subsequently, reversed the low flow eGFR. An increase in the flow of eGFR is regarded as an enhancement of kidney function, and the reversal of eGFR is a sign that kidney function can improve. Health literacy plays a big part in assisting patients in understanding the process of improving the eGFR and how improvement of the eGFR is important to increasing health outcomes. The healthcare team needs to be aware of the improvements that can be made to the eGFR through utilizing an education plan which includes diet and medication control so the patients can receive reinforcement of the renal care education they have received previously.

Research

The project initiative results showed that health literacy and the eGFR can be increased when the provider actively engages the patient. The results indicated that as the health literacy of the patient increases, the self-efficacy of the patient increases, leading to more compliance of health care treatments and an improved health status. Rak (2014) has also noted that increased health literacy shows an increase in patients controlling their diabetes. Research in renal maintenance has broadened plans of care to include the assessment of eGFR as the key guide to evaluating kidney function (Ricardo et al., 2014). Baines (2008) stresses that eGFR should be used to assess kidneys, especially if the eGFR is falling as this diagnostic measure is significant in the early diagnosis and treatment of renal insufficiency. More research should be done on eGFR and the value in using it as a baseline measure in renal care. Also, more research should

be done on health literacy and understanding why health literacy is not used more in the clinical area as well as using it as a teaching tool to guide patients.

Social Change

Social change is part of a new patient care practice where patients help take care of themselves. The new social change and key phrase “health literacy” brings new meaning to the clinic, and places the patients into different teaching categories depending on what they score on their BLHS. Every patient was screened when they came into the clinic on their initial visit and rescreened on subsequent visits. Health literacy scores should always be updated and can always be improved. The taking of baseline health literacy scores is a new social change in the clinic that provides more information about the patient and provides staff with a better understanding of the patient’s needs.

One of the after effects of social change is a transformation in practice due to evidence-based practice and modifications of the patient’s needs (Zaccagnini &White, 2011). One change that has not readily taken hold with family practitioners is using eGFR values as a baseline standard to alert patients to change their diet or medications (Patel et al., 2010). The standard has been to assess the creatinine levels for renal function, and it may be difficult to change practice tactics. However, many nephrologists are requesting healthcare clinic send patients with signs of renal insufficiency earlier in their diagnosis (Levey et al., 2015). The nephrologists want to see patients and evaluate them earlier because patients are seen with their creatinine levels elevated and their renal injury may be irreversible (Levey et al., 2015).

Strengths and Limitations of the Project

Strengths

A strength of the project is in the correlational analysis in which investigators collect more data than in regular research projects. A correlational project allows for more analysis of data and more study of the question (Polit, 2010). The project used the BHLS, a validated tool that has been used in a variety of outpatient settings. In addition, the project was made available for English and Spanish-speaking participants. All paperwork was in English and Spanish for participants, making it more accessible easier to understand.

Another strength of the project was the staff who were willing to participate and helped to complete the project on schedule without problems. The results generated from the DNP project are applicable to different areas of health, in primary care, and in specialty health care areas.

A third strength was the clinic atmosphere that welcomed and relaxed the participants. The environment allowed the patients to provide insight into how they experienced the project. During the weekly visits, many opportunities were afforded to the patients for teaching and discussion of misconceptions they had toward diabetes and renal care.

Limitations

The first limitation is that the measurement of eGFR may not be determined accurately if patients have abnormal amounts of muscle mass or conditions that affect the

creatinine in their body. Other conditions that may affect eGFR are patients with amputated limbs (one participant in the project) people who have large amounts of fluid retention, or those with renal insufficiency (Ricardo et al., 2014). The project was directed at a small primary care clinic, which may limit the generalization of the results (Polit, 2010). The third limitation was related to time and resource constraints because there was only one provider for the project and limited staff to help. The questionability of the limited staff to influence the participants regarding education was hesitant due to certain circumstances that arose in the clinic. The project did request adequate staff be provided to help assist with the anticipated plans. However, there were certain circumstances when resources were thin and the staff had to extemporize

Recommendations

Recommendations for the project include expanding the information gained in the DNP project by exploring more evaluations of eGFR in pre-diabetics and early diabetics. My project only included patients with uncontrolled diabetes with Hgb A1C of $\geq$ 8.0%. or more and it would be beneficial to other patients to explore the effect of eGFR maintenance and evaluations in controlled diabetes and early diabetes. An expanded exploration could discuss the eGFR in early diabetes and with lapses in diet when the patient is not on a regimented food plan. Pre-diabetic patients necessitate reassurance of early healthy behaviors to delay or prevent diabetes (The American Diabetes Association [ADA], 2015).

Other recommendations for expansion of the DNP project include evaluations of

initial changes of eGFR or early recognition of patients with stage 2 CKD (renal insufficiency). This expanded program would aid other health providers and patients in knowing what to assess in a progressing disease state and when to get assistance or seek nephrology. A further study of the project could be exploring what potential comorbid diseases are contributing to the renal dysfunction. Knowing these comorbid diseases early could alert the patient and staff of monitoring techniques and possible tools to use to help monitor the process. Information of monitoring techniques for corvid diseases could enlighten the patient's prognosis of his/her disease and to the treatment management or co-management with nephrology to stop progression of the chronic kidney disease (Samal., Wright, Walker, & Linder, 2015). Additionally, recommendations include investigating considerations of new clinical studies of health literacy and patient education. Specifically, larger primary practices that audit their patient's health literacy and how they utilize the information. Information of different primary practices involved with health literacy will aid health providers realize different assimilation practices on health literacy and promoting quality patient education.

Health literacy is an important baseline in patient care and necessitates the initiation of increasing patient rapport and health compliance. The electronic medical record (EMR) should be equipped with a form for health literacy, just as there is a record for diabetic glucose screens, eye checks, and foot checks. The EMR should have a record to track the eGFR in the EMR for fast observation this type of instrument should be examined and evaluated in a project for effectiveness and ease of use.

Recommendations for further studies would include studies in several clinics with larger and more diverse populations. Increased research should be included on kidney care, specifically investigating complications of kidney disease when health providers don't routinely monitor creatinine levels and eGFR levels. More studies that provide different monitor techniques for kidney disease will increase monitoring information of eGFR and creatinine to all providers. More kidney care information is needed since kidney failure symptoms are silent and patients are not aware that they need to seek treatment.

Analysis of Self

As Scholar

The Doctorate of Nursing Practice (DNP) program has prepared me for health care practice in different ways. My confidence has increased because of my education and my poise and ability to use evidence-based practice has improved. The importance of the principles in conducting the practice initiative has carried over from my education and into my practice. I have found new ways to help patients and use different approaches to treat illness for a variety of patients. The DNP program has trained me to use an evidence-based practice and develop a comprehensive plan to carry it out.

As Practitioner

Participation in the project initiative honed my skills as a practitioner because I was required to clarify to everyone including my professor, committee, staff, patients, clinic board and IRB, what project I was doing, the reason for the project, and what I was

to achieve with the project. I had to elucidate this information to each group differently, and then I had to produce results.

Rapport with patients is an important part of health care. The explanation and patient understanding is a big piece of giving care. Being a DNP student enhanced my teamwork skills as well. Taking part in the project helped me apply skills as a leader, plan and execute my plan, and care for my patients. This experience facilitated my understanding of my commitment as a nurse practitioner and expanded my role to incorporate more leadership and effective communication with patients and staff.

As Project Developer

Using the logic model assisted me as a project developer to implement a successful project by establishing the project's activities. As the project developer, I was required to evaluate the project's activities, outputs, and format by effective. The effective planning of the program was attributed to an operative communication with key stakeholders where the gain was the establishment of a quality project. The project had value not only for me as a scholar, but value for the clinic where the project was implemented and to the participants in the project who learned to live more healthful lifestyles.

Future Professional Development

The DNP project purpose was developed to assist those patients that have diabetes who are lost in a web of confusion containing the information of medications and health treatments. The aim was to untangle the information and assist the patients in taking control of their disease process. Specifically, the project sought to pinpoint one of the

gravest adverse effects of diabetes in hopes of serving patients to control the worst-case scenario of their disease process and guide them to be confident in dealing with the rest of their disease process. In addition, the project was developed to give this DNP student a solid foundation for future initiatives.

The clinic where I am currently employed is currently ready to involve me in other projects that will assist the clinic in improving patient care and improving processes for patient care. From implementing the project initiative, I have learned to develop professional relationships with key stakeholders. Additionally, I have learned to analytically interpret, plan, and implement original or present evidence based research in clinical practice. There is great satisfaction and a feeling of professional fulfillment when evidence is presented to the institution and it becomes an actual policy. I am proud to be part of the teamwork that implemented this project.

The actual planning, organization, and implementation of the project was a very hard effort, stressful, time consuming, and very rewarding to realize the results of the project, also the final assessments of the patients, and the policies of the clinic, which transformed for the furtherance of the clinic and patients of the organization where I am employed. I will continue to use these skills to increase the quality of care for the patients and the people in the community by continuing to be the leader that Walden University has built me to be. A leader stemming from the authority of management and practice unlike a leader I have been before. I realize my training has made me more of a leader as I focus on more important arrangements of building teamwork and getting proposed objectives completed. I find I have more patience with my co-workers which helps to

achieve goals more proficiently and expediently. After my education is accomplished, I plan to use my skills to achieve future care initiatives. Additionally, I will teach as a clinical instructor part time in a local University. However, at this point I prefer to be employed in the clinic arena. I will be proud to be a graduate of Walden University and will continue to cultivate with erudition and instruction of clinical care and evidence based practice.

Summary and Conclusions

The health literacy and eGFR project initiative increased health literacy and lowered eGFR in patients that have diabetes. The project initiative developed the knowledge and confidence of the participants and allowed them to be a part of the process of their own care. The findings and implications of the project have demonstrated improvements in health literacy, eGFR and renal function and fasting glucose. An evaluation of the project indicated the participants were satisfied with being a part of the project and felt they had improved their knowledge. The development of the DNP project showed implications in policy development and social change. Because of the project, the base clinic is to assess the health literacy on all patients entering the clinic. Health literacy results of the patients are being presented to The United Way to help the clinic obtain funding to help with financial support as the clinic functions on donations only. The findings of the project initiative will help emphasize to The United Way the improvement of processes in the clinic helping patients understand their health treatments.

Social change is affected by the presence of the nurse practitioner as the main health provider responsible for directing improvements of the patient's self-efficacy through a patient centered care approach. The project initiative facilitated the development of the patient in how they approach their chronic disease and live a healthier life. The outcomes of the project facilitated the development of a policy at the clinic that will ensure the patients receive quality care and the necessary education to help manage their disease process.

Section 5: Scholarly Product Section 4: Discussion and Implications

Introduction

Section 4 discusses the summary of outcomes of a DNP project evaluating the association of health literacy with eGFR. The DNP project used the health literacy assessment to increase the participant's knowledge base of their diabetes and eliminate or decrease adverse effects of renal dysfunction. Participants (n=33) were evaluated for health literacy and the status of their diabetes through evaluating diagnostic laboratory values and obtaining a physical assessment, following the clinical guidelines developed by the American Diabetes Association (2013) over a 4-week period. Section 4 summarizes the results of the DNP project, the conceptual framework, suggestions for use in practice, social implications, analysis of self, and strengths and weaknesses of the project.

Summary and Evaluation of Findings

The DNP project's primary purpose was to assist patients in self-efficacy in their knowledge, maintenance, and prevention of kidney disease. Each of the 33 participants had signs of kidney dysfunction as indicated by a decreasing eGFR. Statistical analysis was completed using MedCalc Statistical Software version 17.0.4 (MedCalc Software; https://www.medcalc.org; 2017) for independent two-sample t-tests and correlation coefficients.

Patient care followed the American Diabetes Association's guidelines (2013). Patient care also provided the diagnostic laboratory tests to assess the status of renal function of participants. The project consisted of three objectives. The first objective was

to measure the health literacy of the patient with Type II diabetes who was demonstrating signs of CKD. The BHLS measured health literacy in patients (Figure 3).

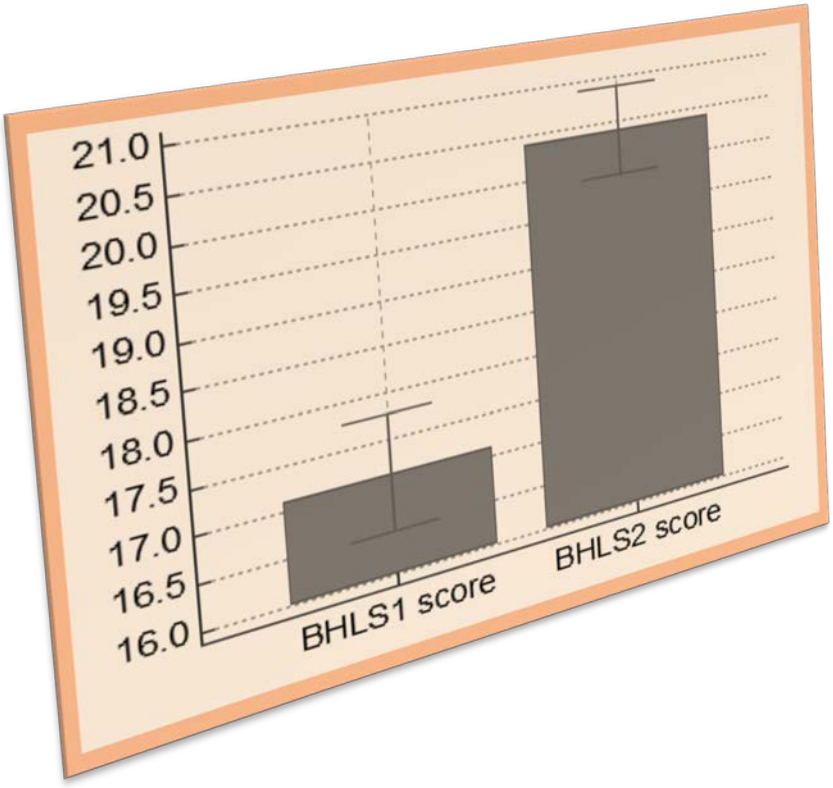

Figure 4. Mean scores of health literacy from the (BHLS. The scores are shown before participant education (BHLS1) and after participant education (BHLS2) measuring literacy. *n*=33.

Health literacy is considered high at a score of 19 or above. Total possible score was 21. The mean health literacy scores of participants before patient education were 17.2. The participants completed the BHLS test in Week 1 of the project and again in Week 4. The mean scores of the BHLS2 test increased to 20.4. The mean scores increased 4.2 points after the four weeks of patient education. Two-sampled *t*-tests were used to examine the characteristic between the BHLS1 and BHLS2 (Table 3). The interpretation of the score differences between the BHLS1 and BHLS2 allowed health

literate scores to be assigned to each participant. The two-tailed probability shows that the result for the BHLS1 and BHLS2 samples were significant, and the difference between BHLS1 and BHLS2 scores did not occur by chance. The increase of the BHLS2 scores was significant, demonstrating that the participant's scores were greater after patient education.

Table 3

The statistical analysis of BHLS 1 and 2 scores

Degrees of Freedom (DF)	64
95% CI of Difference	2.4586 to 4.0869
t-test statistic	8.030
Two-tailed probability	*P* = 0.285 E -010

Note. CI= confidence interval.

The t-test showed the significance of mean differences between two comparison groups. The *t* test found significance with the two-tailed probability number being $p < 0.05$ with *t*-distribution = 1.0 and 95% confidence of the critical value 1. 999.

The second objective was to increase health literacy from a low level to a higher level to enable the patient to understand his health needs. Health literacy was measured using the BHLS. Increasing low health literacy was achieved through comprehensive patient teaching related to the patient's health process and needs. The results on the BHLS2 demonstrated improved health literacy by the increased scores of the BHLS2.

The improvement of diagnostic health markers indicated that the participant complied with medication and health treatments to improve his/her health. The improvement of the diagnostic laboratory values verified that the patient understood his/her chronic disease and achieved his/her health goals to improve wellbeing. The glucose values, prepatent education, and post education are shown in Figure 4 as Glucose 1 and Glucose 2 respectively.

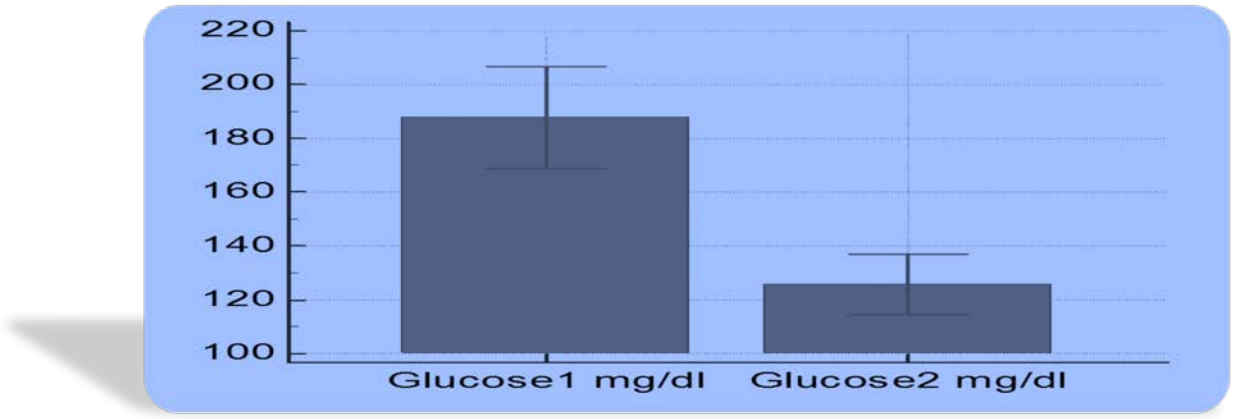

Figure 5. Comparison of Glucose 1 and Glucose 2 mean values. Mg/dl =mg of glucose per deciliter of blood. With education, Glucose 2 presented lower fasting glucose.

The mean for Glucose 1 is 185 mg/dl, a high value for a fasting patient with diabetes. A fasting blood glucose for a patient with diabetes should be below 125 mg/dl (Ricardo et al., 2014). After 4 weeks in the project and after patient education related to dietary changes and medication compliance, the mean glucose decreased to 122 mg/dl. The Glucose 2 sample showed a moderate decrease in glucose averages in 4 weeks,

indicating that participants adhered to the regimen resulting in diminished glucose numbers.

Despite the fact that the Glucose 2 changed in 4 weeks, there were no discernable changes in micro albumin urine or Hgb A1c results. Rak (2014) noted that A1c changes are not obvious until 2-3 months and thus drawing the laboratory value earlier than that will yield no changes. The significance of a reduced fasting glucose for a patient with diabetes is exceptional, as it represents the path towards a sound glycemic index, which affects all areas of a patient's physical health (Ricardo et al., 2014). A fasting glucose that is repeatedly in control is the start of glycemic control (Ricardo et al., 2014).

Two sampled *t*-tests were used to examine the characteristics between Glucose 1 and Glucose 2 (Table 4). The p value of the two-tailed probability shows that the results for Glucose 1 and Glucose 2 samples were significant and that the difference between Glucose 1 and Glucose 2 scores did not occur by chance. Table 4 demonstrates the testing of the significance of the mean differences of the comparison groups Glucose 1 and 2.

Table 4 *Statistical analysis of Glucose 1 and Glucose 2*

Two-tailed probability	P=0.325 E 006
Test Statistic t	-5.702
95% CI of Difference	-83.8027 to -3185
Degrees of Freedom (DF)	64

The *t* test was used to test the significance of mean differences on the glucose values of the participants. The results showed the participants with education could decrease their glucose effectively as shown with a significance $P < 0.05$ with a 95% confidence level of the degrees of freedom and the critical level of the t test at 1.999 with the *t* statistic at -5.702. and the *t* distribution at 1.00.

Included in the assessment process of diagnostic health measures is the evaluation of eGFR, which is important in the appraisal of kidney function of the patient with diabetes. The eGFR, a key diagnostic measure in the project, was observed and evaluated for possible early kidney disease. Figure 5 shows a two-sampled *t*-test of eGFR 1 (before patient education) and eGFR 2 (post patient education). At 4 weeks, there was a noticeable increase of eGFR.

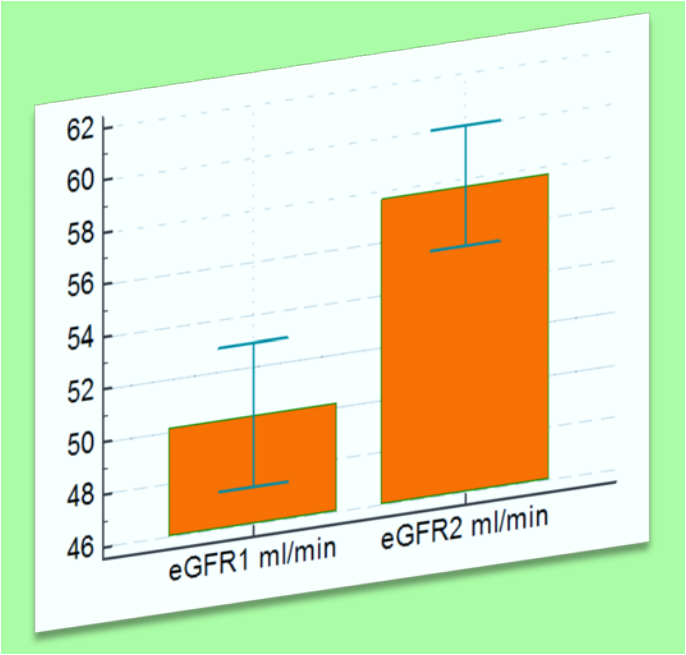

Figure 6. eGFR 1 and eGFR 2 mean flows. eGFR=mean glomerular filtration rate. ml/min= millimeter per minute.

Patient education provided participants' support with their kidney care and subsequently, reversed the low flow eGFR. An increase in the flow of eGFR is regarded as an enhancement of kidney function, and the reversal of eGFR is a sign that kidney function can improve (Ricardo et al, 2014). The two-tailed probability presented a significant number of $p < 0.05$ with a 95% confidence level indicating that the eGFR increased after patient education and did not occur by chance (Table 5). The rise of the eGFR was one of the principal diagnostic tests needed to show improvement of renal function (Ricardo et al., 2014).

Table 5 *Statistical Analysis of eGFR 1 and eGFR 2*

*2*95% CI of difference	4.0062 to 11.0421
Test statistic t	4.279
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Two-tailed probability	*p*= 0 .641 E -004

The findings support the improved flows of eGFR 2 which concur with the statistical significance of the comparison of eGFR 1 and eGFR 2. The *t* statistic of 4.279 and t distribution of 1.000 shows a 95% confidence level with $p < 0.05$. The normal eGFR is 60-96 ml/min (Ricardo et al., 2014). Prior to education, the mean of eGFR was 50 ml/min of the participants. The eGFR in this range places the participants in the category of renal insufficiency (Ricardo et al., 2014). All 33 participants had an increase in eGFR after education.

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The analysis of the eGFR showed an improvement in heath literacy and how the eGFR positively impacted the other diagnostic markers. Health literacy provided the participants of the project with self-efficacy and the improved eGFR helped the participants to realize their own contributions to their health progression. Figure 6 shows the positive correlation of health literacy (BHLS2) and eGFR (eGFR 2) after patient education.

Below is the statistical correlation of health literacy (BHLS 2) and (eGFR 2). The regression line displayed in Figure 6 matches closely the actual correlation scatterplot in Figure 7. The regression line is the best fit line determined by the calculations computed on the computer showing how the scatterplot should appear with the best possible scenario. The scatterplot shows the correlation exists, but does not show the causation of the correlation (Polit, 2010) The positive correlation answers the question asked by the third objective: “What is the relationship between the health literacy and eGFR?” The scatterplot and statistical analysis of BHLS 2 and eGFR 2 demonstrates that as the health literacy increases so does the eGFR.

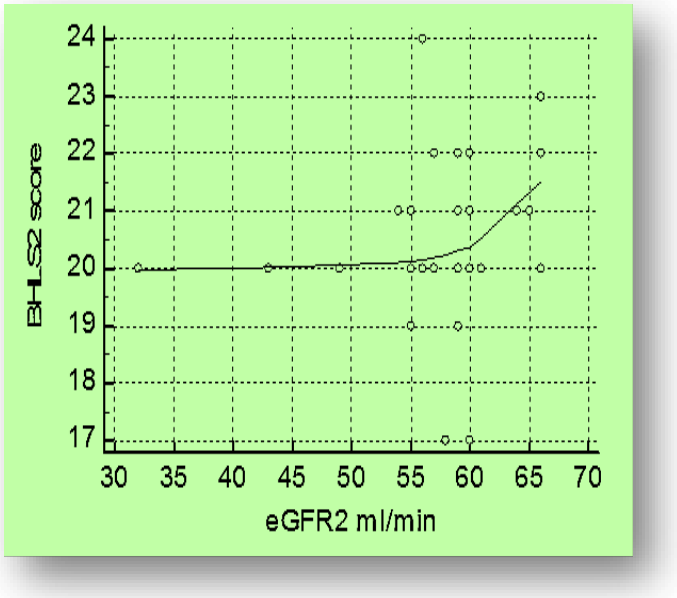

Figure 7. Correlation scatter plot illustrates a moderate positive relationship where the trend is upward and the points fall loosely in a general upward positive direction.

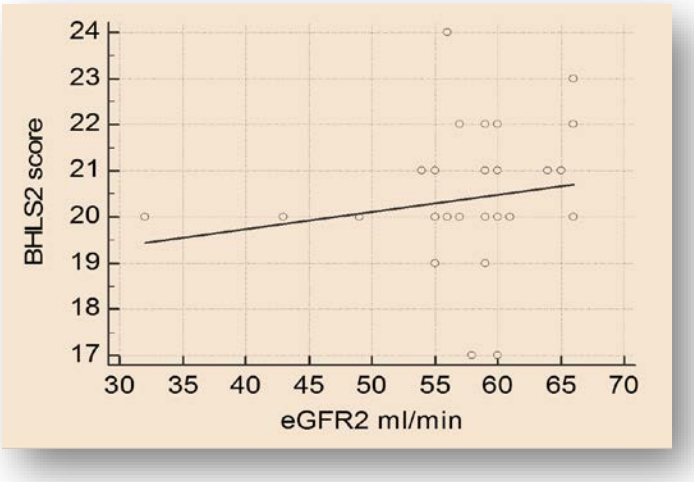

Figure 8. Scatter plot with regression line. The regression line indicates the correlation scatter plot to be valid for the project

Table 6 indicates statistically the correlation shows a positive relationship demonstrating the significance of the positive correlation. The statistical equation validates the correlation between health literacy and eGFR in that they parallel in direction but the correlation does not prove causation (Polit, 2010).

Table 6

Statistical analysis of BHLS2 and e GFR2

F-test for Equal variance	P< 0 20 E-012
T-Test	Assuming equal Variances
95% CI of difference	34.9760 to 39.6301
Test statistic t	32.024
Degrees of freedom	64

Note. p <0.05 with a 95% confidence level of the degrees of freedom and the critical level of the t-test at 1.66 with the t statistic at 32.024 for two tailed testing.

The third objective was fulfilled with the analysis showing a positive relationship between the BHLS2 and the eGFR. Increasing health literacy will not automatically increase the patient's wellbeing, unless the patient is compliant to his/her medical advice and treatments. How this compliance will occur will depend on the relationship between the health provider and the patient. Compliance will only exist if the health provider has a rapport with the patient that the patient can relate to (Baker, 2006).

The DNP project satisfaction survey showed participants were satisfied and had gained practical knowledge from the project. The scale was from 20 to 5, with 20 points equals to very satisfied and 5 points equals to very unsatisfied with the project. The scale continued with 10 points equals to not being happy with the project; and 15 points equals to being satisfied with the project. The graph shows the results of 33 participants being satisfied or very satisfied with the project. The approval scores were ranging in the high scores of 20 with the participants feeling as though they had learned essential points important to their health from participating in the project (Figure 8).

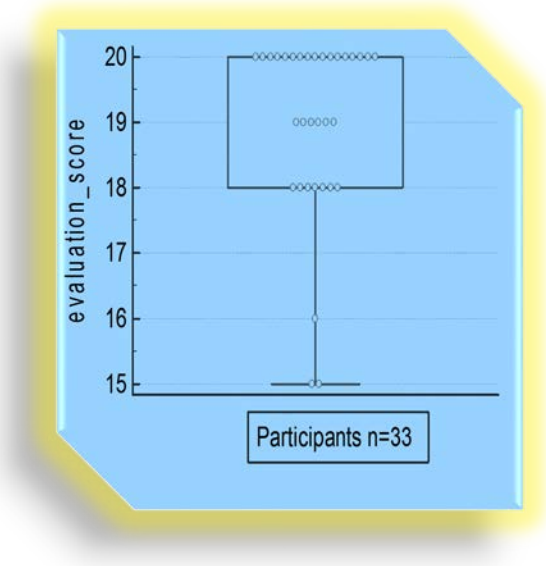

Figure 9. The evaluation scores of participants.

Discussion of findings in the context of literature and frameworks

The literature strongly favors health literacy as a self-motivating state that is needed for patients to understand spoken and written health instructions (Powell et al., 2007). A patient's diabetes improves when the patient is an advocate of their own health and is compliant with health treatments, medications, and diet (Berkman et al., 2010). The project shows health literacy, along with patient education, is associated with greater patient self-efficacy and improvement in diagnostic scores. Diabetes self-efficacy is associated with lower glucose levels, leading to less adverse effects such as renal complications (Powell et al., 2007).

The framework of the logic model represents a method of how a project with

processes work to achieve certain outcomes (Erwin et al., 2016). The primary purpose of the logic model is to provide the participants with education and health management skills and to maintain glycemic control through self-efficacy (Powell et al., 2007). Self-efficacy is important for patients with diabetes, especially for those patients with low health literacy because (King, 2010). The logic model uses guidelines to assist patients in planning programs for their lifestyle that support them in planning health goals for their illness (Erwin et al., 2016).

Early detection facilitates the appropriate diagnosis and treatment of acute and chronic kidney diseases. However, since kidney disease is silent until late in the disease process, it is important that patients participate in their care to protect and care for their kidneys. The patients working together with their health provider can help with early detection of kidney failure. Health literacy is vital for a patient with a chronic disease to maintain health. A baseline health literacy level is important for a health provider to know what to teach a patient what he/she requires maintaining their health. When a patient is receptive a health provider can teach the information, they require, at the level he/she can understand, then the patient could take part in understanding what is needed to manage their health care.

Implications

Policy

Since many of the healthcare provider responsibilities fall on the advanced practice nurse, the nurse practitioner must ensure that the patient is a part of the health care process (Terry, 2015). Many primary care services, such as wellness and prevention services, use

nurse practitioners to diagnose and manage many common, uncomplicated, acute illnesses and chronic diseases such as diabetes (Terry, 2015). The patient can partner with the nurse practitioner and work to maintain the health of the patient. The patient participating in his/her health care can help prevent unnecessary, costly emergency room visits and other added costs of complications of chronic diseases such as neuropathy, amputation, diabetic retinopathy, or renal disease. Many of the indigent have no home base health care, and nurse practitioners are filling the void by working in the clinics that offer primary care to patients without insurance. Primary care for the indigent, with the nurse practitioner as the primary provider, allows for the timely diagnosis of chronic diseases and maintenance care of the chronic diseases to prevent complications.

Practice

Especially in the person diagnosed with diabetes, the decreasing eGFR can be the first and only sign of kidney dysfunction. Thus, it is crucial for patients and health providers to be aware that the eGFR can be reversed. The eGFR is the amount of flow through the glomerular tubules in the renal system (Ricardo et al., 2014). An eGFR of less than 60 ml/min can be the first sign of developing kidney problems (Ricardo et al., 2014). The early reversal of eGFR can stop kidney damage and positively impact a patient's illness. Improvement of eGFR in clinical practice can lead to a better rapport between the patient and health provider, which, for the patient, increases disease awareness, self-care fulfillment, and improved health outcomes (Ricardo et al., 2014). Furthermore, new care plans for health literacy and eGFR are needed to boost health outcomes (Ricardo et al., 2014).

Patient education provided participants' support with their kidney care and subsequently, reversed the low flow eGFR. An increase in the flow of eGFR is regarded as an enhancement of kidney function, and the reversal of eGFR is a sign that kidney function can improve. Health literacy plays a big part in assisting patients in understanding the process of improving the eGFR and how improvement of the eGFR is important to increasing health outcomes. The healthcare team needs to be aware of the improvements that can be made to the eGFR through utilizing an education plan which includes diet and medication control so the patients can receive reinforcement of the renal care education they have received previously.

Research

The project initiative results showed that health literacy and the eGFR can be increased when the provider actively engages the patient. The results indicated that as the health literacy of the patient increases, the self-efficacy of the patient increases, leading to more compliance of health care treatments and an improved health status. Rak (2014) has also noted that increased health literacy shows an increase in patients controlling their diabetes. Research in renal maintenance has broadened plans of care to include the assessment of eGFR as the key guide to evaluating kidney function (Ricardo et al., 2014). Baines (2008) stresses that eGFR should be used to assess kidneys, especially if the eGFR is falling as this diagnostic measure is significant in the early diagnosis and treatment of renal insufficiency. More research should be done on eGFR and the value in using it as a baseline measure in renal care. Also, more research should

be done on health literacy and understanding why health literacy is not used more in the clinical area as well as using it as a teaching tool to guide patients.

Social Change

Social change is part of a new patient care practice where patients help take care of themselves. The new social change and key phrase “health literacy” brings new meaning to the clinic, and places the patients into different teaching categories depending on what they score on their BLHS. Every patient was screened when they came into the clinic on their initial visit and rescreened on subsequent visits. Health literacy scores should always be updated and can always be improved. The taking of baseline health literacy scores is a new social change in the clinic that provides more information about the patient and provides staff with a better understanding of the patient’s needs.

One of the after effects of social change is a transformation in practice due to evidence-based practice and modifications of the patient’s needs (Zaccagnini &White, 2011). One change that has not readily taken hold with family practitioners is using eGFR values as a baseline standard to alert patients to change their diet or medications (Patel et al., 2010). The standard has been to assess the creatinine levels for renal function, and it may be difficult to change practice tactics. However, many nephrologists are requesting healthcare clinic send patients with signs of renal insufficiency earlier in their diagnosis (Levey et al., 2015). The nephrologists want to see patients and evaluate them earlier because patients are seen with their creatinine levels elevated and their renal injury may be irreversible (Levey et al., 2015).

Strengths and Limitations of the Project

Strengths

A strength of the project is in the correlational analysis in which investigators collect more data than in regular research projects. A correlational project allows for more analysis of data and more study of the question (Polit, 2010). The project used the BHLS, a validated tool that has been used in a variety of outpatient settings. In addition, the project was made available for English and Spanish-speaking participants. All paperwork was in English and Spanish for participants, making it more accessible easier to understand.

Another strength of the project was the staff who were willing to participate and helped to complete the project on schedule without problems. The results generated from the DNP project are applicable to different areas of health, in primary care, and in specialty health care areas.

A third strength was the clinic atmosphere that welcomed and relaxed the participants. The environment allowed the patients to provide insight into how they experienced the project. During the weekly visits, many opportunities were afforded to the patients for teaching and discussion of misconceptions they had toward diabetes and renal care.

Limitations

The first limitation is that the measurement of eGFR may not be determined accurately if patients have abnormal amounts of muscle mass or conditions that affect the

creatinine in their body. Other conditions that may affect eGFR are patients with amputated limbs (one participant in the project) people who have large amounts of fluid retention, or those with renal insufficiency (Ricardo et al., 2014). The project was directed at a small primary care clinic, which may limit the generalization of the results (Polit, 2010). The third limitation was related to time and resource constraints because there was only one provider for the project and limited staff to help. The questionability of the limited staff to influence the participants regarding education was hesitant due to certain circumstances that arose in the clinic. The project did request adequate staff be provided to help assist with the anticipated plans. However, there were certain circumstances when resources were thin and the staff had to extemporize

Recommendations

Recommendations for the project include expanding the information gained in the DNP project by exploring more evaluations of eGFR in pre-diabetics and early diabetics. My project only included patients with uncontrolled diabetes with Hgb A1C of $\geq$ 8.0%. or more and it would be beneficial to other patients to explore the effect of eGFR maintenance and evaluations in controlled diabetes and early diabetes. An expanded exploration could discuss the eGFR in early diabetes and with lapses in diet when the patient is not on a regimented food plan. Pre-diabetic patients necessitate reassurance of early healthy behaviors to delay or prevent diabetes (The American Diabetes Association [ADA], 2015).

Other recommendations for expansion of the DNP project include evaluations of

initial changes of eGFR or early recognition of patients with stage 2 CKD (renal insufficiency). This expanded program would aid other health providers and patients in knowing what to assess in a progressing disease state and when to get assistance or seek nephrology. A further study of the project could be exploring what potential comorbid diseases are contributing to the renal dysfunction. Knowing these comorbid diseases early could alert the patient and staff of monitoring techniques and possible tools to use to help monitor the process. Information of monitoring techniques for corvid diseases could enlighten the patient's prognosis of his/her disease and to the treatment management or co-management with nephrology to stop progression of the chronic kidney disease (Samal., Wright, Walker, & Linder, 2015). Additionally, recommendations include investigating considerations of new clinical studies of health literacy and patient education. Specifically, larger primary practices that audit their patient's health literacy and how they utilize the information. Information of different primary practices involved with health literacy will aid health providers realize different assimilation practices on health literacy and promoting quality patient education.

Health literacy is an important baseline in patient care and necessitates the initiation of increasing patient rapport and health compliance. The electronic medical record (EMR) should be equipped with a form for health literacy, just as there is a record for diabetic glucose screens, eye checks, and foot checks. The EMR should have a record to track the eGFR in the EMR for fast observation this type of instrument should be examined and evaluated in a project for effectiveness and ease of use.

Recommendations for further studies would include studies in several clinics with larger and more diverse populations. Increased research should be included on kidney care, specifically investigating complications of kidney disease when health providers don't routinely monitor creatinine levels and eGFR levels. More studies that provide different monitor techniques for kidney disease will increase monitoring information of eGFR and creatinine to all providers. More kidney care information is needed since kidney failure symptoms are silent and patients are not aware that they need to seek treatment.

Analysis of Self

As Scholar

The Doctorate of Nursing Practice (DNP) program has prepared me for health care practice in different ways. My confidence has increased because of my education and my poise and ability to use evidence-based practice has improved. The importance of the principles in conducting the practice initiative has carried over from my education and into my practice. I have found new ways to help patients and use different approaches to treat illness for a variety of patients. The DNP program has trained me to use an evidence-based practice and develop a comprehensive plan to carry it out.

As Practitioner

Participation in the project initiative honed my skills as a practitioner because I was required to clarify to everyone including my professor, committee, staff, patients, clinic board and IRB, what project I was doing, the reason for the project, and what I was

to achieve with the project. I had to elucidate this information to each group differently, and then I had to produce results.

Rapport with patients is an important part of health care. The explanation and patient understanding is a big piece of giving care. Being a DNP student enhanced my teamwork skills as well. Taking part in the project helped me apply skills as a leader, plan and execute my plan, and care for my patients. This experience facilitated my understanding of my commitment as a nurse practitioner and expanded my role to incorporate more leadership and effective communication with patients and staff.

As Project Developer

Using the logic model assisted me as a project developer to implement a successful project by establishing the project's activities. As the project developer, I was required to evaluate the project's activities, outputs, and format by effective. The effective planning of the program was attributed to an operative communication with key stakeholders where the gain was the establishment of a quality project. The project had value not only for me as a scholar, but value for the clinic where the project was implemented and to the participants in the project who learned to live more healthful lifestyles.

Future Professional Development

The DNP project purpose was developed to assist those patients that have diabetes who are lost in a web of confusion containing the information of medications and health treatments. The aim was to untangle the information and assist the patients in taking control of their disease process. Specifically, the project sought to pinpoint one of the

gravest adverse effects of diabetes in hopes of serving patients to control the worst-case scenario of their disease process and guide them to be confident in dealing with the rest of their disease process. In addition, the project was developed to give this DNP student a solid foundation for future initiatives.

The clinic where I am currently employed is currently ready to involve me in other projects that will assist the clinic in improving patient care and improving processes for patient care. From implementing the project initiative, I have learned to develop professional relationships with key stakeholders. Additionally, I have learned to analytically interpret, plan, and implement original or present evidence based research in clinical practice. There is great satisfaction and a feeling of professional fulfillment when evidence is presented to the institution and it becomes an actual policy. I am proud to be part of the teamwork that implemented this project.

The actual planning, organization, and implementation of the project was a very hard effort, stressful, time consuming, and very rewarding to realize the results of the project, also the final assessments of the patients, and the policies of the clinic, which transformed for the furtherance of the clinic and patients of the organization where I am employed. I will continue to use these skills to increase the quality of care for the patients and the people in the community by continuing to be the leader that Walden University has built me to be. A leader stemming from the authority of management and practice unlike a leader I have been before. I realize my training has made me more of a leader as I focus on more important arrangements of building teamwork and getting proposed objectives completed. I find I have more patience with my co-workers which helps to achieve goals

more proficiently and expediently. After my education is accomplished, I plan to use my skills to achieve future care initiatives. Additionally, I will teach as a clinical instructor part time in a local University. However, at this point I prefer to be employed in the clinic arena. I will be proud to be a graduate of Walden University and will continue to cultivate with erudition and instruction of clinical care and evidence based practice.

Summary and Conclusions

The health literacy and eGFR project initiative increased health literacy and lowered eGFR in patients that have diabetes. The project initiative developed the knowledge and confidence of the participants and allowed them to be a part of the process of their own care. The findings and implications of the project have demonstrated improvements in health literacy, eGFR and renal function and fasting glucose. An evaluation of the project indicated the participants were satisfied with being a part of the project and felt they had improved their knowledge. The development of the DNP project showed implications in policy development and social change. Because of the project, the base clinic is to assess the health literacy on all patients entering the clinic. Health literacy results of the patients are being presented to The United Way to help the clinic obtain funding to help with financial support as the clinic functions on donations only. The findings of the project initiative will help emphasize to The United Way the improvement of processes in the clinic helping patients understand their health treatments.

Social change is affected by the presence of the nurse practitioner as the main health provider responsible for directing improvements of the patient's self-efficacy through a patient centered care approach. The project initiative facilitated the

development of the patient in how they approach their chronic disease and live a healthier life. The outcomes of the project facilitated the development of a policy at the clinic that will ensure the patients receive quality care and the necessary education to help manage their disease process.

Introduction

The structure and execution of a DNP project are significant. Just as important is the reporting and distribution of results. The DNP program and education have prepared the scholar to implement a project and report its results. The mode of the dissemination is essential to the audience that receives the information as this project will be of interest to the family and adult practitioner and not to the woman's health practitioner or pediatric practitioner. In addition, other health providers may have an interest in the project such as diabetic care nurses and physician's assistants.

The DNP provides information on interprofessional teamwork and suggests that professional nurse practitioners should share their knowledge for innovative distribution or new evidence for research into practice (AACN, 2006). Distribution of a poster for other professionals to learn from is an important way to distribute information. As advanced scholars, DNP students are expected to provide information in a way that augments learning. A poster presentation would be beneficial for other professions to learn about my project. The added knowledge gained should be shared to motivate other scholars, to provide leadership, or to promote theories and treatments.

Poster Presentation

An interesting event that would provide a valuable platform for disseminating the results of the health literacy/ eGFR project initiative would be any of the family nurse practitioner conferences that are held yearly by presentation of a poster or oral presentation. Specially, the North Texas Nurse Practitioner meeting or the Texas Nurse

Practitioner annual conference would be ideal. A poster presentation be a wonderful opportunity to engage with other nurse practitioners and discuss my project. The poster would be an informative media to present to my peers and discuss the points of the project and the implications of the results. An interaction of this type (conference poster presentation) would give me the opportunity to answer any questions and support my findings (Figure 9). In addition, this would also be an acceptable avenue that other health providers could be educated about early detection and treatment of eGFR.

Summary

The ability to implement a project and see results that can change a patient and cause improved patient outcomes are inspiring. The chance to attend a DNP program that has given me the opportunity to gain the knowledge I needed to use a critical approach to practice and research and initiate a social change. I am very appreciative that I had the chance to implement the project, analyze the statistics, and document the results. The project served 33 participants, and each participant was given knowledge on their diabetes and kidney insufficiency. The results of the DNP project will be disseminated by submission in a poster presentation in the North Practitioner monthly meeting and then will be applied for a nurse practitioner national meeting in the current future.

The Effect of Health Literacy in Low Estimated Glomerular Filtration Rates and Diabetes

Nicklett Johnston Walden University

Background

The necessity for the assessment of health literacy was due to their low socioeconomicalclass and lower educational background. Vulnerable populations have socioeconomic inequality and adverse health-related behaviors, existing comorbid conditions, and limited access to health care, which would be pathways leading to chronic kidney disease.

Purpose Statement

The project's objective was to assess the health literacy in patients diagnosed with diabetes who presented with a low eGFR. The diagnostic marker eGFR was essential for the health provider to assess and manage kidney function.

Nature of the Project

Low health literacy has a crucial role in patients misinterpreting their health education (Koh, 2010). The more complex the chronic disease, the poorer adherence to medication and health management was shown (Chandra et al., 2011).

Project Objectives

1. Merasure the health literacy of the patient with diabetes who was demonstrating signs of CKD. The Brief Health Literacy Screen (BHLS) was used.
2. Increase health literacy from a low level to a higher level to enable the patient to understand his health needs.
3. Questions how health literacy affects the eGFR. The effect of health literacy was revealed by variations in diagnostic markers and eGFR.

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Design

The project used a correlational prospective design to determine if increasing the health literacy of patients with Type II diabetes improved their eGFR. The project entailed selecting patients with Type II diabetes and with low eGFR then assessing their health literacy. The goal of the educational intervention was to increase their health literacy and potentially increase the patient's health outcomes.

Framework

The purpose of the logic model was to illustrate the order of events that classified project resources, match resources to needs, stimulate the service process, complete the service process, and measure the results (Kettner, Moroney& Lawrence, 2013).

Population/Setting

The setting was a nonprofit clinic in a small suburb of Dallas, Texas. The clinic is a Family Clinic and sees approximately 7,450 patients a year of all ages, including Army Veterans. The target population was composed of patients between the ages of 20-65 years who have diabetes type 2 with an eGFR less than 60 (mL/min/1.73).

Data Collection

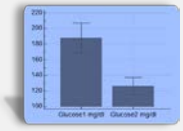
The participant's initial visit consisted of a physical assessment, laboratory analysis including the complete metabolic panel (CMP), Hgb A1c, fasting glucose finger stick, microalbumin urine, and documentation of current medications. At the initial visit, the BHLS instrument was given to the participant to assess his/her level of health literacy

Data Results

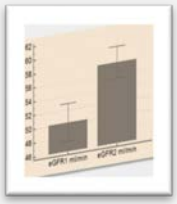
Each of the 30 participants had signs of kidney dysfunction as indicated by a decreasing eGFR. Statistical analysis was completed using MedCalc Statistical Software version 17.0.4 (MedCalc Software; https://www.medcalc.org; 2017) for independent two-sample t-tests and correlation coefficients.

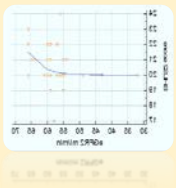
The participants completed the BHLS test in week one of the project and again in week four. The mean scores of the BHLS2 test increased to 20.4. The mean *scores increased 4.2 points after the four weeks of patient education.*

Comparison of Glucose 1 and Glucose 2 mean values. With education, Glucose 2 presented lower fasting glucose.



At 4 weeks, there was a *noticeable increase* of eGFR





The scatterplot and statistical analysis of BHLS 2 and eGFR 2 demonstrates that as the health literacy increases so does the eGFR.

Conclusions

Results showed health literacy with patient education was associated greater patient self-efficacy and improved fasting glucose numbers, eGFR flows, and health literacy scores.

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Figure 10 Poster for presentation dissemination of the project.

The poster above will be used to explain and teach information pertaining to the project. This poster will be the start of the dissemination of the project.

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Appendix A

Renal Maintenance Teaching Guide

1. Estimating GFR

The amount of urine may not change considerably, but blood configuration varies. Monitoring laboratory data may identify CKD complications. Protection of renal dysfunction includes avoiding NSAIDs, carbonated drinks, and artificial sweeteners. Drink water and stay hydrated.

2. Check micro albumin urine

Safe levels are less than 30 mg/g. At this point it is important to manage chronic diseases: Diabetes gluconate hemoglobin less than 7, Blood pressure less than 130/80mg/Hg, and Obesity and weight maintenance is important an ideal BMI is within the range of 18.5 to 24.9. Diet is important for the chronic diseases (Turner, Bauer, Abramowitz, Melamed, & Hostetter, 2012).

3. Cardiovascular protection ACE/ARB

High blood pressure medications. People with kidney disease may experience worsening high blood pressure. Commonly, angiotensin-converting enzyme (ACE) inhibitors or angiotensin II receptor blockers are used to preserve kidney function. High blood pressure medications can initially decrease kidney function and change electrolyte levels; frequent blood tests to monitor this may be required. Also, recommended and needed may be a water pill (diuretic) and a low-salt diet.

4. Medications to maintain homeostasis

Medications to lower cholesterol levels. Statins are needed to lower cholesterol. Individuals with chronic kidney disease often acquire high levels of bad cholesterol, which can intensify the risk of heart disease. Medications to treat anemia. Anemia may develop early while CKD due to inadequate synthesis of erythropoietin by the kidneys. Supplements of the hormone erythropoietin at times with added iron are needed. Erythropoietin supplements aid in manufacturing more red blood cells, which may relieve fatigue and weakness accompanying anemia.

5. Medications to help the kidneys

Medications to relieve swelling. People with chronic kidney disease may retain fluids, which will produce swelling in the legs. Medications termed diuretics help maintain the balance of fluids. Medications to protect your bones. Calcium and vitamin D supplements may be prescribed to aid bones and lower fracture risk. Also, prescribed may be medication to lower the amount of phosphate in your blood to guard against calcification of blood vessels. A lower protein diet. As your body processes protein from foods, the waste products in the kidneys must filter from your blood. To reduce the extra work for the kidneys a low protein diet may be advised (National Health Institute, 2015).

KIDNEY CARE

NO IBUPROFEN, MOTRIN, NAPROXIN, OR ALEVE

NO CAFFIENE, NO CHOCOLATE or ARTIFICIAL SWEETENER

Drink

Appendix B

Patient Evaluation Form

4= Strongly Agree 3= Agree 2=Disagree 1=Strongly Disagree

The project was well organized 4 3 2 1

The project helped me to learn about my health 4 3 2 1

The help me to learn what I can do to stay healthier 4 3 2 1

The information I gained from the project was useful 4 3 2 1

I would recommend this project to other patients 4 3 2 1

Appendix C

Health Literacy Assessment BHLS (Brief Health Literacy Screen)

1. If your need to go to the doctor, clinic or hospital, how confident are you in filling out the medical forms yourself?

_____ Not at all confident (1)

_____ A little confident (2)

_____ Somewhat confident (3)

_____ Quite confident (4)

_____ Extremely confident (5)

2. How often do you have someone (family member or staff at the clinic or hospital) help you to read health
or medical forms?

_____ Always (1)

_____ Often (2)

_____ Sometimes (3)

_____ Occasionally (4)

_____ Never (5)

3. How often do you have problems learning about your health because of trouble understanding written health information?

_____ Always (1)

_____ Often (2)

_____ Sometimes (3)

_____ Occasionally (4)

_____ Never (5)

4. How often do you have trouble understanding what your doctor, nurse, or pharmacist (druggist) tells you
about your health or about treatments?

_____ Always (1)

_____ Often (2)

_____ Sometimes (3)

_____ Occasionally (4)

_____ Never (5)

5. How often do you have trouble remembering instructions from the doctor, nurse or pharmacist (druggist)
after you get home?

_____ Always (1)

_____ Often (2)

_____ Sometimes (3)

_____ Occasionally (4)

_____ Never (5)

(Sand-Jecklin & Coyle, 2014)

Appendix D

Helping Hands
ROCKWALL COUNTY

January 14, 2016

To Whom It May Concern:

I grant Nicklett Johnston permission to facilitate her scholarly project "The Effect of Health Literacy in low glomerular filtration rate in Type II diabetes."

There is minimal risk to patients and we are happy to help her in any way to complete this project.

Sincerely,

Jon Bailey
President & CEO
Rockwall County Helping Hands

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