

**THE TRIAD OF DIABETIC UROPATHY:
AN EVIDENCE-BASED PRACTICE EDUCATIONAL INTERVENTION FOR HEALTHCARE
PROFESSIONALS CARING FOR THE LATINO/HISPANIC POPULATIONS**

By

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Abstract

Background: Limited awareness and knowledge of diabetic uropathy can lead to preventable yet detrimental conditions that negatively impact quality of life. Diabetic uropathy encompasses a triad of diabetic sequela affecting the genitourinary tract: Diabetic Bladder Dysfunction (DBD), Genitourinary Tract Infections (GUTIs), and sexual dysfunction. Many of these complications can remain undetected, advance to irreversible conditions, and become life-threatening. The Centers for Disease Control and Prevention (CDC) (2021) estimates that more than half of Latino adults in the United States will develop Type 2 Diabetes (T2D) in their lifetime. Diabetes is the 5th leading cause of death among Latinos in the United States (CDC, 2015) and complications are disproportionately worse in this population (CDC, 2021). The World Health Organization (WHO) estimates that as much as 90% of people living with diabetes have some form of diabetic uropathy (Agochukwu-Mmonu et al., 2020). Despite the high prevalence, these complications have been largely underestimated and overlooked (Wittig et al., 2019). Recognizing the link between diabetes and occult diabetic uropathies may therefore help clinicians prevent life altering diabetic complications through early screening and detection. Immediate priority and preventative interventions to halt this sharp rise of T2D is crucial for the health of the nation and the world.

Purpose: The purpose of this project was to develop, implement, and evaluate an online EBP educational program regarding diabetic uropathy to determine its effectiveness on increasing knowledge of diabetic uropathy among healthcare professionals caring for the Latino population.

Methods: The project was based on an intervention employing a one group pretest-posttest survey with a convenience sample of forty-eight participants. A 1-hour online EBP educational program on the triad of diabetic uropathy was developed and implemented by the primary investigator through Zoom Communications, Inc. Participants were healthcare professionals ($n = 48$) consisting of nurse practitioners, physicians, physician assistants/associates, and registered nurses. Evaluation of knowledge was examined using a peer-reviewed investigator-created survey administered via Zoom polling feature immediately before and after intervention. Descriptive statistics and a paired t -test were performed on Microsoft Excel to analyze the results.

Results: A paired *t*-test showed that participants had significantly higher post-test mean scores ($M = 8.98$) when compared to the pre-test mean scores ($M = 5.90$) ($p < 0.001$). Higher scores indicate greater knowledge of diabetic uropathies. The difference in mean scores was 3.08, demonstrating a 30% average increase in knowledge among participants.

Conclusion: Despite limitations, the online EBP educational program appears to be an effective tool for increasing knowledge of diabetic uropathies. Further research on diabetic uropathies, particularly as they relate to the Latino population, is needed to expand the scant literature currently available that explores the pathogenesis of diabetic uropathies and the impact on the Latino population. Additional educational programs would build on knowledge and awareness that may mitigate diabetes and its complications.

Chapter 1

Introduction

There is limited awareness and knowledge of preventable genitourinary complications of diabetes that are detrimental to a person's quality of life (Wittig et al., 2019; Daneshgari et al., 2009). These complications can remain undetected and advance to irreversible conditions that can become life-threatening. Diabetes is the 5th leading cause of death among Latinos in the United States (Centers for Disease Control and Prevention [CDC], 2015) and the complications are disproportionately worse in Latino populations (CDC, 2021). The CDC (2021) estimates that more than half of Latino adults in the United States will develop Type 2 Diabetes (T2D) in their lifetime. The World Health Organization (WHO) estimates that 25-90% of people living with diabetes have diabetic uropathy (Agochukwu-Mmonu et al., 2020). Despite the high prevalence, these complications have been largely underestimated and overlooked until recently (Wittig et al., 2019). Recognizing the link between diabetes and occult diabetic uropathies may therefore help clinicians prevent life altering diabetic complications through early screening and detection. The aim of this evidence-based project was to evaluate the effectiveness of an educational intervention intended to increase provider knowledge and awareness of diabetic uropathy. Immediate priority and preventative interventions to halt this sharp rise of T2D is crucial for the health of the nation and the world. Of note, the term Hispanic will be used when citing literature but for all other purposes, and to be more inclusive of the newer Hispanic generations that may not speak Spanish but whose descent or genetics have an implication on T2D predisposition, the Latino terminology will be used.

Background

Diabetes is the 7th leading cause of death in the United States. The financial burden of diabetes on individuals, families, and healthcare systems is rising (CDC, 2020). More than 34 million Americans are affected by diabetes (Healthy People 2030, n.d.) and 21.4% of adults remain undiagnosed (National Institute of Diabetes and Digestive and Kidney Disease [NIDDK], 2020). Direct and indirect costs of diabetes in the United States accumulate to a yearly estimate of 327 billion dollars (CDC, 2020; Sadikot et al., 2017), and the financial burden is expected to rise as cases of T2D increase. Lack of clinician knowledge and training in occult diabetic uropathy can contribute to these costs (Sadikot et al., 2017).

Hispanics have the highest incidence of newly diagnosed T2D (CDC, 2020). They are known to suffer from more severe complications and deaths associated with T2D than non-Hispanic Whites (CDC, 2021). With the second highest poverty rate in the nation (United States Census Bureau, 2019), Latinos are at greater risk for uncontrolled T2D sequela. Barriers to positive healthcare outcomes in this population make it challenging for clinicians to diagnose and manage T2D in Hispanics (Healthy People 2030, n.d.; Office of Minority Health, 2021). These barriers are now recognized as social determinants of health (SDOH) (Aguayo-Mazzucato et al., 2019; Healthy People 2030, n.d.). Among the pre-existing barriers is financial hardship. Healthcare costs can be 2-3 times higher in patients with low-income status due to management and treatment of complications that develop over the long course of the disease, compounding the financial burden in this population (Sadikot et al., 2017).

According to Healthy People 2030 (n.d.), promoting healthy choices alone will not eliminate health disparities. Reducing costs for an already vulnerable Hispanic/Latino population, with the second highest poverty rates in the nation (United States Census Bureau, 2020), is critical.

Poor Awareness and Limited Knowledge of Urologic Uropathies

Limited awareness and knowledge of preventable genitourinary complications of diabetes, for both the public and healthcare professionals, negatively impact the life of people living with diabetes (Wittig et al., 2019; Daneshgari et al., 2009), but potentially more so in minority groups like Hispanics/Latinos that are unduly affected by SDOH (Aguayo-Mazzucato et al., 2019; CDC, 2021 April; Healthy People 2030, n.d.). Like diabetes, urologic complications of diabetes in the lower genitourinary tract can remain undetected and advance to irreversible conditions that are severe and even life-threatening (Wittig et al., 2019; Coffee et al., 2020; Gandhi et al., 2017; El-Qushayri et al., 2020; Radcliffe & Khan, 2020). Most health care providers are aware of the more common complications of diabetes like cardiovascular disease, diabetic nephropathy, diabetic retinopathy, and diabetic neuropathy; However, diabetic uropathy, a term recognized since 1935 (Inouye et al., 2018) is still unknown to many (Wittig et al., 2019).

Daneshgari (2011) defined diabetic uropathy as a “range of debilitating urologic complications” inclusive of a broader range of complications than bladder cystopathy alone (Inouye et al, 2018). The term encompasses the triad of 1) diabetic bladder dysfunction (DBD), 2) diabetic related genitourinary

tract infections (GUTIs), and 3) sexual dysfunction. Although there is no consensus on the most proper terminology, diabetic uropathy appears to be the best umbrella term to describe the cluster of urologic complications associated with diabetes and will be used for this evidenced-based practice (EBP) intervention that collectively presents them in an organized fashion.

Need for Continued Learning and Education

The cornerstone to effective management and prevention of diabetes is the continuous training and education of health professionals, individuals, and communities (Okuroğlu & Alpar, 2019). Staying well-informed may be particularly challenging for most overburdened clinicians that struggle with limited time to take part in continuing education. Efforts to facilitate educational activities may ease the burden of clinicians who may not find in-person training readily feasible. Online learning may offer a convenient way to disseminate knowledge to healthcare professionals, particularly during the current Covid pandemic that limits in-person training. It may also allow for greater reach.

In addition to reducing healthcare costs (Sadikot et al., 2017), educating healthcare providers on diabetic uropathy is essential for promoting early screening and detection, early intervention, and timely referrals. Education may even empower providers to lead T2D community health promotion programs that include education and counseling.

Aim/Objective of Evidence-Based Practice (EBP) Project

To evaluate the effectiveness of an online EBP education program intended to increase knowledge of diabetic uropathy.

PICO Question

What is the effectiveness of an online educational program designed to increase knowledge of diabetic uropathy among healthcare professionals serving the Hispanic/Latino populations?

Operational Definitions

Hispanic and Latino

The primary investigator recognizes that both the terms “Hispanic” and “Latino” are used in the literature when denoting people who reside in the United States but identify being of Latin American descent (Morales et al., 2020). The term ‘Hispanic’ refers to those born in a territory conquered by Spain where Spanish continues as the dominant language (Aguayo-Mazzucato et al., 2019). It should be noted

that federal agencies use the term Hispanic for collecting health data, census data, and epidemiological data. This data is typically published using the combined term “Hispanic/Latino” (Aguayo-Mazzucato et al., 2019), making it challenging to use a singular term when referring to this group. Although used interchangeably, Latino (or Latinx) appears to be the more inclusive term. This term refers to people who do not speak Spanish but identify as having Latin American roots (Morales et al., 2020). In this project, both terms may be used interchangeably. The term Hispanic will be used when citing literature using this term, but for all other purposes, and to be more inclusive of the newer Hispanic generations that may not speak Spanish but whose descent or genetics have an implication on T2D predisposition, the Latino terminology will be used.

Diabetic Uropathies

Diabetic uropathies are urologic complications of diabetes that can present themselves within a triad of 1) diabetic bladder dysfunction (DBD), 2) diabetic related genitourinary tract infections (GUTIs), and 3) sexual dysfunction (Daneshgari et al., 2017; Inouye et al., 2018).

Acronyms and Abbreviations

HCP: Healthcare Professionals (Nurse Practitioners, Physicians, Physician Assistants/Associates, Advanced Practice Providers, APRNs, RNs, LVNs)

T2D: Type 2 Diabetes

GUTIs: genitourinary tract infections

DBD: diabetic bladder dysfunction

SDOH: Social determinants of health

LUTs: lower urinary tract symptoms

PVR: post-void residual

OAB: overactive bladder

UAB: underactive bladder

NGB: neurogenic bladder

DMSD: diabetic male sexual dysfunction

FSD: female sexual dysfunction

DED: diabetic ejaculatory dysfunction

RE: retrograde ejaculation

AE: anejaculation

DE: delayed ejaculation

PE: premature ejaculation

Rationale for EBP Project

According to the Institute of Medicine (2003), “evidence-based practice (EBP) is one of the core competencies for all healthcare providers” (as cited in Dang & Dearholt, 2018, p. 3). Clinicians have an influential impact on improving the health of a population. Increasing knowledge of diabetic uropathy is an opportunity for healthcare providers to meet competency and improve patient outcomes that would help eliminate health disparities in people living with T2D. As Dang & Dearholt (2018, p. 3) explain, “discovery of new knowledge alone does not have an impact unless it is translated into practice.” Specific Hispanic directed interventions are needed to mitigate T2D burdens (Aguayo-Mazzucato et al., 2019).

Significance of EBP Project

Review of literature reveals a paucity of research that addresses the specific needs of the Latino population as it relates to the urologic sequela of diabetes. Nevertheless, with this rapidly growing population continuing to have high incidence of diabetes (CDC, 2021), clinicians should equip themselves with sufficient understanding of diabetic uropathy and implement culturally appropriate interventions when caring for Latinos with diabetes (Botelho & Lima, 2020; Pender et al., 2011). This project aligns with The Office of Minority Health and Health Equity’s goal of addressing health disparities in minority groups with diabetes (FDA, 2020) and Healthy People’s 2030 (n.d.) goal of reducing deaths associated with diabetes while improving quality of life for all.

Conceptual Framework

Nursing Theory: Nola Pender’s Health Promotion Model (HPM)

Once healthcare providers are aware of diabetic uropathy, they can use Nola Pender’s Health Promotion Model (HPM) as a theoretical framework (Pender et al., 2011) to teach patients about urologic complications of T2D, signs and symptoms to report, and ways to maintain a healthy urological system, free of diabetic insults. Pender’s (1996) revised HPM, originally developed in 1982, groups behavior determinants into three categories. The first category considers individual characteristics and

experiences. The second, considers behavior-specific perceptions and influences. The third category considers health promoting behavior accounting for competing demands and preferences that affect behavioral outcome.

The purpose of the HPM is to help healthcare professionals understand the major drivers shaping a patient's health behavior and to serve as a foundation for behavioral guidance to attain a healthy lifestyle (Pender et al., 2011). The HPM has cross-cultural relevancy due to the diverse ethnic backdrop of our nation where culturally appropriate research, education, and practice can enhance access to health promotion (Badong, 2019; Joseph, 2016; Gonzalo, 2021; Pender et al., 2011). The benefit of using this model would be to reduce morbidity and mortality of preventable diseases or conditions in the Latino population, reduce health care costs, and most importantly improve the health and well-being of individuals, families, and communities at a local, national, and global level (Badong, 2019). It is a model that strives for health equity and encourages HCPs to furnish patients with impactful resources that promote health through meaningful and sustainable behavior change (Joseph, 2016; Badong, 2019).

Chapter 2

Literature Review

The review of literature synthesized the current medical literature on the burden of diabetes in Hispanics and considerations to take when serving this population, as well as the triad of diabetic uropathies that have been noticeably under-researched despite their prevalence (Wittig et al., 2019): 1. Diabetic Bladder Dysfunction (DBD), 2. Diabetic related Genitourinary Tract Infections (GUTIs), and 3. Sexual dysfunction (Daneshgari et al., 2017; Inouye et al., 2018). A review of the extant literature revealed a paucity of urological research that addresses the less understood diabetic uropathies of T2D, particularly as it relates to the Latino population.

Burden of Diabetes in Latino Population

Diabetes is the 7th leading cause of death in the United States (Healthy People 2030, n.d.) but the 5th among Hispanics, who are disproportionately affected by this condition (Centers for Disease Control [CDC], 2021). Per the 2020 US Census, Hispanics are the fastest growing population in the United States, accounting for 18.7% of the U.S. population. This percentage equates to more than 62 million people (Jones, et al., 2021), a number that is expected to double by 2060 (United States Census Bureau, 2018).

Hispanics have the highest incidence of newly diagnosed T2D (CDC, 2020). More than half of this population is likely to develop T2D in their lifetime, and die from more severe complications (NIDDK, 2020) of diabetes. In addition to genetic predisposition to T2D, factors related to SDOH are likely to contribute to greater severity of complications and deaths (Aguayo-Mazzucato et al., 2019; CDC, 2021 April; Healthy People 2030, n.d.).

Common SDOH encountered in this group are language and healthcare literacy barriers, economic instability, home insecurity, limited access to nutritious foods, limited access to health care, racism, or discrimination, and/or decreased job or educational opportunities (Healthy People 2030, n.d.). Latinos are therefore more likely to have worse complications, poorer health outcomes, and increased mortality rates compared to their non-minority counterparts. Sociocultural barriers have a significant impact on this population, but inadequate T2D education may also contribute (Aguayo-Mazzucato et al., 2019).

Language Barriers

Limited English proficiency significantly hampers effective quality care (Aguayo-Mazzucato et al., 2019). The inability for patients to communicate in the same language spoken by the provider can be detrimental to their health (Julliard et al., 2008). It can impede the patient from asking questions or disclosing important information that affects their health (Aguayo-Mazzucato et al., 2019), particularly when it comes to issues dealing with their genitalia or topics of sexual health (Julliard et al., 2008). This may be especially problematic for early detection and management of diabetic uropathies because patients may not divulge sensitive urological problems without prompting.

Lack of Latino Providers

Successful communication, higher rated patient satisfaction, and optimal clinical outcomes rely heavily on patient-provider racial concordance (Wilbur et al, 2020). In 2015, the Association of American Medical Colleges reported that only 5% of medical school graduates were Latino. Latino HCPs may deliver more culturally fitting care instilled with innate mutual respect that offers a more welcoming environment for Latinos to disclose important information they would otherwise withhold. Increasing provider diversity must therefore become a strategic priority for addressing Latino healthcare disparities and improving access to care for the growing Latino communities.

Low Health Literacy

Patients with T2D and marginal health literacy have been associated with higher rates of complications, poor glycemic control, and inadequate diabetes knowledge (Aguayo-Mazzucato et al., 2019). Aguayo-Mazzucato et al. (2019) claim that when patients are unable to read, understand, or construe written materials or health information, their ability to make healthier choices or seek prompt medical attention is hindered. Poor health literacy was reported in about 62% of the Latino population.

Socioeconomic Status (SES)

The development of T2D and its associated complications is heavily influenced by poverty (Aguayo-Mazzucato et al., 2019) and Hispanics have the second highest poverty rate in the nation (United States Census Bureau, 2019). Valdez et al. (2019) state that, "A culture of hard work combined with an imbalanced landscape of Hispanics in low-wage job markets may lead segments of this population living in lower socioeconomic strata to overprioritize work and underprioritize their physical

health” (p. 6). Immigration status can further compound the predicament of prioritizing work over personal health when there is mistrust in the health care system and concern for deportation.

Cultural Values and Beliefs

Values and beliefs play an integral role in health care behavior among the Latino population (Aguayo-Mazzucato et al., 2019). Cultural values and beliefs are based on intersectional beliefs shaped by an interplay of socioeconomic determinants, media, institutions, and social interaction (Lekas et al., 2020). The fallacy of current cultural competency trainings is the assumption that culture is a stagnant set of values and beliefs equally shared by a presumably homogenous group (Lekas et al., 2020), which is not true for the diverse Latino population (Noe-Bustamante, 2019).

Paucity of T2D Uropathy Research Specific to Latinos

A review of extant literature revealed a paucity of research that addresses the specific needs of Latinos with diabetic uropathy. However, due to the rapidly growing Hispanic population with a high incidence of diabetes (CDC, 2020; World Population Review, 2021), providers must understand and implement culturally appropriate interventions when managing diabetes and its complications in this vulnerable group.

Special Considerations When Managing T2D Uropathies in the Latino Population

Strive for Linguistic and Cultural Humility

In the provision of health care services, striving for linguistic provisions is key to successful health care literacy in the Latino population. Aguayo-Mazzucato et al. (2019) stated that effective diabetes self-care management starts with a patient’s ability to recognize symptoms. The authors believed that proper “health care literacy can help Latinos understand, interpret, and act on diabetes symptoms” (p. 18). Healthcare providers should promote health care literacy by screening and delivering oral and written information in a patient’s native language. Aguayo-Mazzucato et al. (2019) believed that when symptoms of diabetes are perceived to be severe enough to threaten functional status, Latinos are more likely to seek medical attention. Studies have verified improved glycemic control (lower HgA_{1c} levels) in patients with adequate health care literacy (Aguayo-Mazzucato et al., 2019).

If a provider is not fluent in a patient’s native tongue, interpreter services should be provided. It is important for family members not to serve as interpreters. When family members are used as interpreters,

not only can it violate patient confidentiality (Julliard et al., 2008), but it may also increase risk of medical error through mistranslation (Squires, 2018). Moreover, both patient and family members may feel uncomfortable discussing or translating sensitive information that is commonly brought up when addressing urologic concerns, like sexual health or terminal diagnosis (Squires, 2018). Culturally, Latinos tend to avoid discussing sexual topics with anyone and shield children from the topic of sex altogether (Squires, 2018). The belief is that sex and issues related to sex are private matters that should remain to oneself (Squires, 2018). Ensuring a warm and trusting environment prior to discussing sensitive topics may help patients feel less vulnerable and embarrassed.

Ethically and legally, children should never serve as interpreters unless there is a medical emergency (Turnbull et al., 2019). Federal laws require the use of qualified medical professionals be used for non-English speaking patients if those medical providers receive federal funding (Turnbull et al., 2019). Relying to non-English speakers the importance of interpreter services in preventing medical errors shows consideration for their safety and well-being, thereby instilling trust in the patient-provider relationship (Julliard et al., 2008). Julliard et al. (2008) found that without the qualities of compassion, kindness, caring, and human interest, Latinas, in particular, do not feel safe sharing information. The authors also found that a predictor of disclosure was showing interest in the form of a question. For these reasons, it is important to nurture a trusting relationship that invites patients to feel safe enough to fully disclose important urologic information and feel more at ease with a genital exam when indicated.

One must be wary of cultural “competency” training. To appreciate implicit bias and intersectionality, recent literature recommends abolishing the false notion of cultural competency and embracing cultural humility instead (Lekas et al., 2020). Recent peer-reviewed literature offers support that meeting cultural competence is a false and hazardous notion, and that cultural competency trainings, mandated and supported by federal agencies with good intention, can even proliferate stereotypes and stigmatism (Lekas et al., 2020). Advocating for humility trainings to enhance a clinician’s ability to provide patient-centered care that fosters awareness of one’s own bias, privilege, and limitations of skills and understanding (Lekas et al., 2020) of the Latino culture can help dismantle implicit racist attitudes and behaviors contributing to health disparities. Providers should be aware of opportunities for modernized trainings.

Lekas et al. (2020) recommended embracing themes of intersectionality and implicit bias to formulate cultural humility provider training that orients care towards the appreciation of patients' lay expertise, receptiveness to sharing power with patient, and life-long learning from patients. This can help providers unmask the forces and complexities of the Latino population, that potentially influence its fluid set of values, beliefs, and behaviors, to individually customize patient-centered care delivery (Botelho et al., 2020; Lekas et al., 2020). As the vehicle and drivers of education and health promotion, healthcare providers have a responsibility of continued learning and development of humble cultural interventions that can improve T2D outcomes in the Latino population.

Diabetic Uropathies

Diabetic Bladder Dysfunction (DBD)

Diabetic Bladder Dysfunction (DBD) refers to an array of progressive signs and symptoms of the lower urinary tract affecting the quality of life (QOL) of over half of those living with longstanding or poorly controlled diabetes (Wittig et al, 2019; Agochukwu-Mmonu et al., 2020; Klee et al., 2019). Several authors (Agochukwu-Mmonu et al., 2020, Wittig et al., 2019; Klee et al., 2019; Hughes et al., 2019; Inouye et al., 2018; Daneshgari et al., 2017; Liu & Daneshgari, 2015) consider it the most common genitourinary complication of diabetes, arguably more common than diabetic nephropathy and diabetic neuropathy (Agochukwu-Mmonu et al., 2020), but it remains under-researched (Wittig et al, 2019; Daneshgari et al., 2009, Daneshgari et al., 2017). The pathogenesis of DBD remains unclear (Wittig et al, 2019; Daneshgari et al., 2017). Medical literature suggests a complex and multifactorial etiology (Agochukwu-Mmonu et al. 2020; Wittig et al., 2019; Klee et al., 2019; Hughes et al., 2019; Inouye et al., 2018; Shin et al., 2016; Daneshgari et al., 2017; Liu et al., 2015) that encompasses disturbances of the bladder, autonomic nerves, and urethra (Liu et al., 2015).

Both hyperglycemia and polyuria are two main independent contributors of physiological changes in the urinary tract leading to DBD (Agochukwu-Mmonu et al., 2020). Recent breakthroughs, however, demonstrate that, like other complications of diabetes (ex. retinopathy and nephropathy), a nucleotide-binding oligomerization domain-like receptor (NLR) inflammasome is activated by hyperglycemia, not polyuria (Hughes et al., 2019; Inouye et al., 2018). Hughes et al. (2019) further suggest that a plethora of diabetic insults, including hyperglycemia, converge to activate the NLRP3 gene. This is when numerous

metabolites, ATP, oxidative stress, ischemia, and other metabolic dysregulations are detected in the urothelium by the NLRP3 gene that activates the inflammatory response that leads to bladder denervation and dysfunction. Polyuria, independent of this inflammatory response, leads to bladder hypertrophy through unknown pathways (Xiao et al., 2013).

Although definitive research is still needed to delineate the exact pathophysiological mechanisms leading to DBD, symptoms can be classified into early and late-stage categories. Symptoms in a compensated bladder stage characterized by increased bladder hypertrophy and contractility in response to polyuria fall under early stage DBD (Wittig et al., 2019). Symptoms of a decompensated bladder stage characterized by deterioration of voiding function, weakened detrusor muscle, and end stage flaccid bladder in patients with sequela of diabetic autonomic neuropathy (DAN) and oxidative processes, are categorized under late stage DBD (Wittig et al., 2019).

Early-Stage Diabetic Bladder Dysfunction.

Overactive Bladder (OAB) Phenotype.

The early stage of Diabetic Bladder Dysfunction (DBD) is characterized by irritative storage symptoms (Wittig et al., 2019) that carry an overactive bladder (OAB) phenotype (Hughes et al., 2019). It is suggested that an increased presence of C-fibers, pain sensors found in the bladder urothelium of patients with diabetes (Hughes et al., 2010), and a spastic detrusor muscle contribute to this phenotype. In addition, Agochukwu-Mmonu et al. (2020) suggest that microvascular complications may also contribute to an overactive DBD phenotype. According to Agochukwu-Mmonu et al. (2020) & Wittig et al. (2019), symptoms of early stage DBD include frequency of micturition, urgency, polyuria, nocturia, with or without incontinence.

Incontinence (urge incontinence (UI), stress urinary incontinence (SUI), or mixed urinary incontinence (MUI)) is likely to be the most bothersome symptom, present in > 50% of diabetic patients, with DM females twice as likely to suffer from incontinence than non-diabetic females, and is associated with poor glycemic control ($HgA_{1C} > 8.4\%$) (Agochukwu-Mmonu et al., 2020 & Wittig et al., 2019). Each increase in HgA_{1C} of 1% attributes to a 13% increase in any UI and a 34% increase in SUI (Agochukwu-Mmonu et al., 2020).

OAB symptoms are costly, bothersome, and can significantly affect QOL (Wittig et al., 2019). Latinos, who often work in demanding service positions, particularly if undocumented, may be afraid to ask for bathroom breaks due to fear of being fired. Consider asking how these symptoms affect them socially and providing patient a medical excuse letter to provide their employer for medically needed breaks.

Late-Stage Diabetic Bladder Dysfunction.

Underactive Bladder (UAB) aka Atonic/Neurogenic Bladder or Diabetic Cystopathy.

In late stages of DBD, a chronic hyperglycemic state and chronic detrusor overdistension leads to bladder decompensation (Wittig et al., 2019) and a flaccid detrusor muscle. Urologists refer to this condition as diabetic cystopathy or neurogenic bladder (NGB) where the detrusor bladder muscle is atonic or hypotonic. The loss of filling sensation and contractility leads to increase bladder compliance, capacity, and post-void residual (PVR) where urine retention ensues (Agochukwu-Mmonu et al, 2020; Wittig et al., 2019; Yuan et al., 2015). When the PVR is severe and undetected, it can retrograde into the upper genitourinary tract and cause hydronephrosis that may cause renal injury or failure. Stagnant urine in both upper and lower urinary tract also increases risk of infection and urolithiasis (Wittig et al., 2019). The severity of symptoms of late stage DBD varies and often overlaps with symptoms of early stage DBD (Inouye et al, 2018).

Symptoms of Late Stage DBD.

Symptoms of late stage DBD or neurogenic underactive bladder are hesitancy, straining, increased time between voids, impaired bladder emptying, post-void fullness, nocturia, enuresis or incontinence (Wittig et al., 2019; Daneshgari et al., 2017). Polyuria can exacerbate nocturnal enuresis and nocturia. Incontinence in the context of undetected urine retention is likely due to overflow incontinence (Wittig et al., 2019). A voiding diary may help delineate symptoms and severity, and help differentiate between other etiologies.

Signs of Late Stage DBD with Urine Retention.

Signs of late stage DBD with urine retention include abdominal distention from urine retention, increased PVR on bladder ultrasound, hydronephrosis on diagnostic imaging, cystitis or recurrent UTI (rUTI), and elevated serum creatinine if hydronephrosis present (Wittig et al., 2019; Wieder, 2014).

Complications of Late Stage DBD: Urine Retention.

Stagnant urine in a glucosuric environment may lead to infection (persistent or recurrent), urinary tract stones (Wittig et al., 2019), and/or hydronephrosis. Undetected hydronephrosis can lead to renal injury or failure that requires lifelong hemodialysis or renal transplant (Wieder, 2014). This detrimental, life-changing condition can be prevented if detected promptly. Healthcare providers should screen for urine retention in patients with newly diagnosed, poorly controlled, or long-standing diabetes. It should not be assumed that an upward trend in creatinine levels is due to diabetic induced glomerulosclerosis alone. Concurrent hydronephrosis may accelerate or even compound chronic kidney disease that is due to glomerulosclerosis or other etiologies.

Special Considerations for Latino Populations with DBD.

A careful history and probing of urinary symptoms may elucidate the presence of diabetic uropathy. A detailed history can help differentiate between other conditions that mimic DBD or that combine to exacerbate other urologic conditions like BPH in men. According to Agochukwu-Mmonu et al. (2020), "patients can often present with a mixed clinical picture" (p. 4) so it is up to clinicians to help delineate and refer to urologists promptly. Some people with diabetes may be asymptomatic while others may exhibit a wide range of signs and symptoms in either stage or both. Those that are symptomatic are more likely to be recognized to have DBD sooner, but those who are asymptomatic are at risk for having undetected diabetic uropathies that lead to permanent irreversible damage to the genitourinary tract. Since Latinos may not always seek medical attention until symptoms are severe, due to SDOH and aforementioned barriers, community outreach is critical for this population.

Diabetic Related Genitourinary Tract Infections (GUTIs)

Type 2 diabetes is a leading predisposing factor for the development of genitourinary tract infections (Kuttiappan et al., 2021) (GUTIs), as it provides a pathogen-friendly environment that allows opportunistic organisms to grow (Gandhi et al., 2017). A chronic hyperglycemic and immunodeficient state, in combination with vasculogenic and neurogenic dysfunction, makes otherwise simple infections complex and more challenging to eradicate (Gandhi et al., 2017). This can lead to inflammatory complications, abscess formation, necrosis, and gangrenous infections that are life-threatening (Gandhi et al., 2017). The frequency of morbid genitourinary infections (bacterial or fungal) in the bladder, kidney,

genitals, and prostate in men, are significantly greater in people with T2D (Naik & Anemajal, 2021).

Patients should be referred to the emergency department when emergent conditions are suspected.

Emergent GUTIs.

Emphysematous Urinary Tract Infections.

Emphysematous urosepsis, characterized by a gas forming infection, is a rare yet life-threatening condition with a mortality rate of 20-25% (Suzuki et al., 2018). Emphysematous cystitis, pyelonephritis, and prostatitis have all been reported in the literature (Suzuki et al., 2018; Iwamoto et al., 2021), as well as renal and prostatic abscesses (Naik et al., 2021). Emphysematous infections, more commonly observed in people with poorly controlled diabetes, can affect the bladder wall (emphysematous cystitis), the renal parenchyma (emphysematous pyelonephritis), or the prostate in men (emphysematous prostatitis) (Wieder, 2014). In all emphysematous situations, prompt treatment with parenteral antibiotics, +/- percutaneous drainage, +/- possible surgical resection of affected area (Wieder, 2014. Gomella et al., 2015)), and glycemic control is needed. If surgical resection is warranted, it may require a nephrectomy for emphysematous pyelonephritis, partial or full resection of bladder in emphysematous cystitis, or transurethral “unroofing” or full resection of prostate in men with emphysematous prostatitis (Gomella et al., 2015). For a patient who may already have advanced stages of chronic kidney disease (CKD), a nephrectomy may result in end-stage renal disease (ESRD) that requires initiation of hemodialysis. As previously mentioned, such a scenario is life-altering and detrimental to quality of life. For this reason, a patient should be promptly referred to the emergency room when an infection does not improve despite adequate antimicrobial therapy (Okafor & Onyeaso, 2021). Any delay can result in remarkably high morbidity and mortality (Gomella et al., 2015; Wieder, 2014)

Fournier's Gangrene.

Fournier's Gangrene (FG) is another life-threatening urologic emergency with poor outcomes (Rivera-Alvarez et al., 2021). It is a rapidly forming polymicrobial infection of the genital and perineal fascia, the area between the skin and the muscle, that results in necrosis and sepsis (Rivera-Alvarez et al., 2021, Moon et al., 2021; Coffee et al., 2020). Men are ten times more likely than women to suffer from this rare condition with the potential to spread locally to the abdomen or invasively into the muscles and internal organs (Coffee et al., 2020). Multiple immunodeficient conditions predispose people to FG, but

diabetes has been prominently found in 32-66% of the cases, particularly uncontrolled diabetes (Coffee et al., 2020; Moon et al., 2021).

Fournier's gangrene progresses in phases, but the hallmark symptom is an intense onset of genital pain and tenderness (Pais et al., 2021). In an early phase of FG, discoloration of the affected skin is bronze to red, warm, edematous, thin, shiny, and pruritic. As FG progresses, the skin may become blue, purple, or black and cold or numb to touch (Pais et al., 2021; Mayo Clinic, 2021). Should severe pain subside, it may be an indicator of nerve necrosis (Pais et al., 2021; Mayo Clinic, 2021). A person may also have foul smelling or purulent drainage from a sore (Pais et al., 2021; Mayo Clinic, 2021). Systemic symptoms include fever (low or high grade), tachycardia, hypotension, or shortness of breath (Mayo Clinic, 2021). Mortality rates, influenced by co-morbid conditions, vary between 5-76%; highest in people with diabetes (El-Qushayri et al., 2020). Delay in diagnosis or treatment can significantly increase mortality rate (Rivera-Alvares et al., 2021; El-Qushayri et al., 2020). Mortality rates jump from 11%, with a 24-day delay, to 76% with a 6-day delay (Rind et al., 2010), and 100% if left untreated (El-Qushayri et al., 2020). FG awareness is therefore crucial to patient survival and prompt referral to the emergency department is necessary to initiate aggressive broad-spectrum antibiotics and emergent surgical debridement (El-Qushayri et al., 2020).

Providers should prescribe sodium-glucose cotransporter 2 (SGLT2) inhibitor medication used to treat T2D with caution. The U.S. Food and Drug Administration (FDA) published a warning of its link to rare cases of FG and increase risk of candidemia (Moon et al., 2021; Bartolo et al., 2021).

Non-Emergent GUTIs.

Asymptomatic Bacteriuria, Cystitis, rUTI.

The spectrum of a urinary tract infection ranges from asymptomatic bacteriuria (ASB) to symptomatic cystitis, pyelonephritis, and urosepsis (Naik et al., 2021). Patients with T2D are immunodeficient, which when combined with a state of hyperglycemia and glucosuria, create a pathogen friendly environment that makes patients with diabetes more prone to infections of the genitourinary tract. Therapeutic failure, recurrent infections, and poorer outcomes is also possible in this setting (Sabih & Leslie, 2021). Additionally, diabetes induced urine retention and/or hydronephrosis compounds the risk of infection or the development of stones from stagnant urine (Wieder, 2014). Should hydronephrosis or

stones progress without detection or intervention, complications of recurrent UTIs (rUTIs), urinary tract stones, abscesses, acute or chronic renal papillary necrosis, Xanthogranulomatous pyelonephritis (XGP), emphysematous UTIs, and chronic kidney disease or ESRD requiring hemodialysis can ensue (Okafor & Onyeaso, 2021; Wieder, 2014).

A recurrent UTI that failed to respond to previous adequate treatment should prompt further evaluation to rule out potential nidus for infection or anatomic genitourinary abnormalities causing urine obstruction. This can be carried out with renal and post-void bladder ultrasounds in non-urgent cases. Due to increased antimicrobial resistance, prophylactic antibiotics should be avoided unless necessary (Sabih et al., 2021). Antimicrobials in asymptomatic patients is not advised, and men with UTIs should be screened for sexually transmitted infection (Sabih et al., 2021). To avoid false positive or contaminated urine cultures, providers and staff should ensure patient is aware of proper clean mid-stream urine collection technique, as many positive urine cultures in asymptomatic patients can be traced to poor collection (Sabih et al., 2021).

Abscesses.

Gomella et al. (2015), described abscesses as bacterial infections with purulent material confined to the renal parenchyma (renal abscess) that can extend to the perinephric space (perirenal abscess) or rupture Gerota's fascia and spread into the pararenal space (pararenal abscess). Similarly, "fungal balls" or abscesses can form in the urinary tract from fungal infections. Abscesses can occur in the bladder, kidneys, or prostate in men, and may require percutaneous or surgical drainage in addition to medical therapy depending on severity. Depending on location, surgical excision of kidney, bladder, or prostate may be indicated.

Xanthogranulomatous Pyelonephritis (XGP).

Xanthogranulomatous Pyelonephritis (XGP), a pathologic diagnosis, is a chronic inflammatory condition where the kidney is massively enlarged and non-functioning; associated with long-standing hydronephrosis and nephrolithiasis (Gomella et al., 2015; Wieder, 2014). The mainstay treatment for XGP is a simple nephrectomy secondary to the inability to distinguish it from a malignancy on radiologic imaging (Wieder, 2014; Khan et al., 2020). As many people with diabetes may already suffer from chronic kidney disease, hemodialysis would be warranted if patient straight into renal failure post nephrectomy.

Again, undergoing hemodialysis indefinitely is a life-altering circumstance greatly impacting a person's ability to lead a normal life.

Genital Infections.

Posthitis, Balanitis, Balanoposthitis, & Phimosis.

Posthitis, balanitis, and balanoposthitis are highly linked to diabetes (Verma & Wollina, 2011; Gomella et al., 2015). They are inflammatory conditions of the prepuce and glans. They are chiefly caused by bacterial, fungal, or viral overgrowth that thrive in moist environments like the area between the glans and prepuce (Gomella et al., 2015; Wieder, 2014). Of the balanoposthitis complications, phimosis is the most prevalent (23.58%) (Jegadish et al., 2021). Paraphimosis, lichen sclerosis, and meatal stenosis have also been noted (Jegadish et al., 2021; Wieder, 2014), but less often than phimosis. For those with both diabetes and candida balanoposthitis, the incidence of phimosis increases to 70% (Jegadish et al., 2021).

Patients suffering from any of these inflammatory conditions may notice a rash, itchy skin, foul odor, moist erythema of inner prepuce or glans, dysuria, pain with erection or coitus, or ballooning of prepuce when voiding (Verma et al., 2011; Wieder, 2014). On exam, a glossy erythematous glans or prepuce may be observed with possible ulceration, white curd-like discharge, or fissuring of prepuce if phimosis is present (Wieder, 2014). Depending on the degree of phimosis, providers may be limited and unable to screen for squamous cell carcinoma lesions that can sometimes develop from chronic inflammatory changes (Wieder, 2014).

Circumcision may be warranted when conservative measures fail to resolve phimosis or if someone has recurrent balanitis. Health care providers should discuss with patient the need to optimize diabetes (to achieve HgA_{1c} level < 8%) when referring to urology and prior to surgical consultation. This may help prevent increased risk of poor healing, wound dehiscence, infection, or poor surgical outcomes.

Providers should also consider performing a genital exam when a patient has new, poorly controlled, or long-standing diabetes. Urologic complications are often diagnosed incidentally on exam because many men shy away from discussing genito-uro-sexual problems. Even more so in Latino patients with poor health literacy or limited English proficiency who feel it is taboo to discuss; They may require more attention and education in their native language (Jegadish et al., 2021).

Vaginitis/Vulvovaginitis.

Vaginitis, or vulvovaginitis (VV), is the inflammation of the vagina, or vulva and vagina, typically due to an infectious process (Gomella et al., 2015; Wieder, 2014). The leading culprit of infectious vaginitis or VV is *Candida albicans* (Wieder, 2014), which can mimic cystitis. Symptoms include itching, burning, irritation, abnormal discharge, urgency, frequency, dysuria, or dyspareunia (Gomella et al., 2015; Wieder, 2014). Like balanitis, vaginitis is linked to T2D, and can be an adverse effect of SGLT2 inhibitor medication used to treat hyperglycemia (Kalra & Kalra, 2017) or secondary to antibiotic use. If hyperglycemia is not well controlled, VV therapy will likely fail (Kalra et al., 2017). If someone is having four or more episodes of symptomatic VV within one year, healthcare providers should evaluate for poorly controlled diabetes and reconsider continuation of SGLT2i medication linked to candidemia (Kalra et al., 2017). It may be beneficial to hold SGLT2i medication with an active candida infection and resume its use, if appropriate, once infection has resolved (Kalra et al., 2017).

Sexual Dysfunction**Male Sexual Dysfunction.**

Male sexual dysfunction (MSD) is one of the more recognized urologic complication of T2D (Mostafa & Abdel-Hamid, 2021). The long-term harm to nerves, blood vessels, and endocrine glands from chronic hyperglycemia affect male reproductive health and fertility (Mostafa et al, 2021; He et al., 2021). Nearly half of all men with diabetes have issues with fertility (Ray & Pramanik, 2020). Diabetic autonomic neuropathy (DAN) and endothelial dysfunction are thought to be the main cause of sexual dysfunction (Ray et al., 2020), but the entire multifaceted mechanisms are still not completely understood (He et al., 2021).

There is a lack of full consensus to how diabetes impairs male fertility, but current literature suggests induced germ cell apoptosis and decreased testosterone production play a role (Ray et al., 2020). He et al. (2021) suggests that T2D induces four reproduction-related complications that require glycemic control to cease sexual dysfunction progression. These conditions are diabetes mellitus erectile dysfunction (DMED), diabetic ejaculatory disorders (DED), functional hypogonadism, and female sexual dysfunction (FSD).

Diabetic Mellitus Erectile Dysfunction (DMED).

Men with diabetes are three times more likely to have erectile dysfunction than those without (Ray et al., 2020) and are more likely to fail treatment modalities (Kirby, 2021) when diabetes is poorly controlled. Potential etiologies of DMED are vast and may combine to make DMED more severe. These include endothelial dysfunction (causes prevents ability to maintain penile rigidity), low testosterone, cardiovascular disease, diabetic autonomic neuropathy (DAN), medications, or structural diseases like recurrent balanitis (Ray et al., 2020).

Diabetic Ejaculatory Disorders (DED).

Symptoms of diabetic ejaculatory disorders (DED) that occur in 40% of males with diabetes include premature ejaculation, delayed ejaculation, anejaculation, and retrograde ejaculation (RE), the latter being the most common (Mostafa et al., 2021). Patient perceived anejaculation or diminished ejaculatory volume associated with diabetes may be related to RE and all can alter fertility potential in patients with DED (Gomella et al., 2015). According to Gomella et al. (2015), diabetic related retrograde ejaculation occurs from neural disruption impairing the bladder neck closure mechanism. Patients with DED can experience ejaculatory pain, anesthetic ejaculation, decreased ejaculatory volume, decreased force of ejaculation, or have no ejaculate. This can be alarming and troublesome for men, especially those wishing to impregnate a woman.

For providers of the opposite sex caring for males with sexual dysfunction, a safe and trusting environment may ease disclosure of key information when elicited or increase patient comfort level during genital exam.

Functional Hypogonadism.

Functional hypogonadism is the clinical syndrome associated with low serum testosterone levels that can be linked to diabetes and the metabolic syndrome (Gomella et al., 2015). Increased risk of cardiovascular disease, anemia, and fractures are possible (Ray et al., 2020; Gomella et al., 2014; Wieder, 2014). Men with diabetes may have significant decreased sperm motility, abnormal sperm morphology, or lower semen volume and sperm count (Ray et al., 2020). Symptoms of hypogonadism include low libido (64%), erectile dysfunction (74%), fatigue (63%) (Ray et al., 2020), mood disturbances, increased body weight, or altered masculine features (Wieder, 2014). Signs of hypogonadism may

involve structural changes of the reproductive organs (ex., testicular atrophy) or semen quality changes that affect fertility (Ray et al., 2020). Clinicians should consider obtaining biochemical testing and referring to endocrinology or andrology specialties when a patient has symptomatic hypogonadism (Ray et al., 2020).

Female Sexual Dysfunction.

Female Sexual Dysfunction (FSD) is defined as a group of disorders related to “desire, arousal, orgasm, or sexual pain” (Barbagallo et al., 2020). Recent evidence showed that prevalence of FSD in the U.S. population is 12% greater than men, but is often unnoticed, undiagnosed, and not treated due to persistent taboos and having a poorly recognized condition (Barbagallo et al., 2020). For this reason, The World Health Organization (WHO) has declared FSD as a basic human right that has a fundamental role in health quality (Barbagallo et al., 2020).

In a study by Wessells et al. (2018), females with high HgA_{1c} and diabetic autonomic neuropathy had higher odds of experiencing FSD. Women with T2D related FSD may suffer from decreased vaginal lubrication (70%) that can exacerbate dyspareunia (43%), decreased libido (64%), inability to reach orgasm (50%), poor sexual satisfaction (47%), or loss of genital sensation (36%) (Barbagallo et al., 2020). Despite the gaps in knowledge on how to support women with this condition, raising awareness to FSD may prompt discussion about sexual health during their clinic encounter for diabetes (Winkley et al., 2021).

The foundation to FSD management relies on a multidisciplinary approach to therapy and both clinician and patient education. This can be accomplished through prompt evaluation and diagnosis of FSD from a clinician, along with suitable patient counseling with therapist for women suffering with both diabetes and FSD (Gupta et al., 2018). Most women find it challenging to discuss their sexual health, more so with a language-barrier (Barbagallo et al., 2020). Like males with sexual dysfunction, language barriers and time constraints may sometimes work together to inhibit disclosure of sensitive health information, particularly when family or children are used to interpret (Julliard et al., 2008).

Given the intimate nature of the symptoms for both sexes, Latino cultures in particular, patients are reluctant to discuss intimate experiences with anyone (Julliard et al, 2008), let alone a culturally under-prepared provider. Julliard et al. (2008) therefore recommend providers build a more inviting and

trusting rapport with patients by being culturally prepared, aware, and making a patient feel heard and respected. This type of relationship is more likely to increase a provider's ability to obtain full disclosure of vital health information that is often left unspoken.

Literature Review Summary

There is an increased need for continuing education of diabetic uropathies that close the gap in knowledge and health disparities related to diabetic uropathies. Providers should equip themselves with knowledge and understanding of emerging information related to diabetic uropathies, as they are key players in preventing urologic complications that have potential to become life altering, life threatening, and lethal. Implementation of culturally appropriate services when managing diabetes and its complications in vulnerable populations is also important. The prevalence of diabetes in the United States is estimated to be >34 million (Healthy People 2030, n.d.). Global estimates are expected to reach 700 million by 2045 (Saeedi et al., 2019). Therefore, immediate priority to interventions that halt the sharp rise of diabetes is crucial for the health of the nation.

Chapter 3

Methodology

The purpose of this scholarly project was to implement an educational program to determine its effectiveness at increasing knowledge of the urologic complications of diabetes. This chapter focuses on the methodology of the project. It includes the type of project, setting, participants, instrumentation, data collection, and data analysis. The practice implication of the educational intervention is added significance to the emerging evidence related to the large spectrum of diabetic uropathies.

Project

This is an EBP project intervention that employed a one group pretest-posttest survey to evaluate the effectiveness of an educational program intended to increase diabetic uropathy knowledge. The EBP educational program, developed and implemented by the primary investigator, covered the entire spectrum of diabetic uropathies and the importance of recognizing and screening for such conditions to promote health in the Latino population. The content of the educational program was based on the evidence collected from database searches in CINAHL, PubMed, Google Scholar, and the following MeSH terms: urologic complications of diabetes, Latinos or Hispanics and diabetes, diabetic uropathy, cystopathy, neurogenic bladder, diabetic autonomic neuropathy, diabetic bladder dysfunction, Fournier's gangrene, emphysematous infections, sexual dysfunction and diabetes, phimosis, balanitis. Evidence was appraised for quality using JHNEBP tool.

Setting

The EBP project used Zoom Video Communications, Inc for the online educational program presentation setting. Anyone with internet access and digital technology could join the online educational session. The setting was open to local, national, and international registrants.

Participants

The target audience was healthcare providers rendering primary care service to Latino populations, but all healthcare professional registrants were included in the sample if they completed both pre- and post-test knowledge surveys. Health professionals registered for the educational session using Zoom Video Communications, Inc. registration tool. The educational program was presented on three separate days and participants were grouped to form one sample size. A total of 118 healthcare

professionals registered for the online educational program, but only 74 joined one of the educational program sessions. Of the total registrants, 44 people (37%) were unable to join the session, 26 people (22%) joined late and therefore unable to complete the pre-test survey (excluded from sample), and 48 people (41%) that attended a session completed both pre- and post-test knowledge surveys.

All participants were required to register for the Zoom meeting to collect demographic information (Appendix A). Participant recruitment included social media LinkedIn, SMS, email, and flyer invitations that included QR code or link to registration site. Registration asked for participant location, age, gender, job title, specialty, years in practice, whether they managed diabetes, and whether they provided care to Latino populations.

Ethical Considerations

This Evidence Based Project was submitted to Clarion University of Pennsylvania's Institutional Review Board (IRB). The IRB determined that this Evidence Based Project did not meet the criteria for research (Appendix B). The EBP project was approved by the DNP project committee.

Measures

Framework

This Evidence-Based Practice (EBP) intervention, guided by Dang & Dearholt's (2018) Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model, is aimed to integrate the best up-to-date evidence into an intervention that provides clinicians effective tools to promptly detect urologic complications of diabetes before they become detrimental to a person's health and quality of life.

The Dang et al. (2018) JHNEBP model uses a 3-phase (**P**actice Question, **E**vidence, **T**ranslation (**PET**)) process to provide an organized approach to solving a practice question, appraising the evidence, and translating findings into practice. The authors' framework is composed of 20 steps that integrate components of inquiry, practice, and learning. Inquiry launches the EBP process through the development of a practice question (Phase 1). Evidence (Phase 2) is then synthesized and reviewed to see if it supports a change in practice. Once the development and implementation of an action plan has been evaluated, the outcome can then be translated (Phase 3) into practice through dissemination of findings.

The JHNEBP model served as a framework for this scholarly project to develop the PICO question that, once answered, will elucidate the effectiveness of the implemented educational program intervention. From inquiry, in the form of the aforementioned PICO question development, to appraising the current evidence and translating it into practice through the implementation of the EBP online education program, the desired outcome is to ultimately prevent diabetic uropathy and diabetes altogether. As a by-product of the intervention, healthcare providers who gain knowledge may develop and implement health promotion strategies and education for Latinos with diabetes in their own community.

Materials

LinkedIn, Microsoft Outlook, SMS, and flyers were used for participant recruitment. Microsoft PowerPoint was used for the educational program development and presentation. The program covered the triad of diabetic uropathies and was peer-reviewed by three distinguished urologists (Appendix C). Zoom Video Communications, Inc. was used for registration, survey administration, and online delivery of the EBP educational intervention. Microsoft Excel was used for data entry and statistical analysis.

Instrument

A ten question, single answer multiple-choice knowledge survey was developed (Appendix D) by the principal investigator to survey the knowledge of participants on diabetic uropathy immediately before and after the educational intervention. Both the pre- and post-test were identical and labeled "Pre-Test Knowledge Survey" and "Post-Test Knowledge Survey" respectively. Reliability of the instrument was not measured by the developer because the test re-test reliability procedures are unable to be performed for the same group of participants. Validity of the instrument was statistically measured with a paired t-test and content validity was also obtained through peer-review from three community urologists (E. Wood, personal communication, October 29, 2021; K.S. Eilber, personal communication, October 29, 2021; R.C. Reznichuk, personal communication, November 1, 2021). One urologist felt the survey could be more challenging, while the other two urologist found it appropriate.

Data Collection***Demographics***

Demographic information was acquired through the Zoom registration survey and used to describe participants in the aggregate. A Microsoft Excel spreadsheet with data was generated through Zoom reports and manually modified to de-identify participants by relabeling identifiers with a corresponding number. This allowed for participant confidentiality and blinding of those reviewing statistical analysis of data.

Pre- and Post-Test Surveys

A pre-programmed Zoom poll was administered at the start and end of the educational session by the primary investigator. Zoom generated poll reports were obtained and survey answers were paired to the respective participant. Surveys collected remained confidential and limited to the primary investigator who de-identified data by assigning a number to each participant.

Data Analysis

The data collected was analyzed using Microsoft Excel. To evaluate the effect of the EBP educational program on the knowledge of healthcare providers serving the Latino population, responses from each question of the pre- and post-test surveys were coded (0 = incorrect; 1 = correct). Correct answers for each participant were calculated to determine a score between 1-10. Higher scores would indicate that the educational activity was an effective tool in increasing knowledge of diabetic uropathy. Statistical means and frequencies were then calculated.

A paired *t*-test for statistical power ($\alpha < 0.05$) analysis was performed by comparing differences between pre- and post-test mean knowledge scores. Each item was also analyzed for frequencies that report correct and incorrect answers.

Methodology Summary

This project aligns with The Office of Minority Health and Health Equity's (OMHHE) goal of addressing health disparities in minority groups with diabetes (FDA, 2020) and Healthy People's 2030 (n.d.) goal of reducing "the rate of all-cause mortality among those diagnosed with diabetes." This chapter focuses on the methodology used to test the effectiveness of an educational intervention developed using the JHEBP model to increase diabetic uropathy knowledge. The setting of the project was set for an

online platform open to a national and global audience. A measurement instrument to test diabetic uropathy knowledge was developed by the primary investigator and peer-reviewed by community urologists. Knowledge surveys were implemented before and after the intervention and data collection was obtained for subsequent statistical analysis.

If effective, clinicians may be influenced or motivated by new knowledge to change their individual efforts in development of their own health promotion and education activities specific to Latinos living with T2D; Thereby, bridging Nola's Health Promotion Theory into practice- Influences such as this EBP educational program, if effective, may also be conducive to health promotion.

Chapter 4

Analysis and Discussion

This chapter provides discussion of results of pre- and post-test knowledge surveys that include both descriptive and statistical analysis, with tables and figures summarizing findings. The data includes pertinent demographic information and survey scores and means before and after the diabetic uropathy educational intervention. Descriptive analysis and paired *t*-test outcomes will be discussed to determine the program's effectiveness in increasing healthcare professional knowledge on diabetic uropathy. Should the EBP educational presentation be found to be statistically significant for effective and positive change in knowledge, healthcare providers may translate knowledge into practice using Nola Pender's HPM to engage the community. Limitations and future directions will be identified.

Results & Analysis

Demographic Variables

Prior to the implementation of the project, participants registered for the educational session and submitted demographic information that provided an overall description of the project's aggregate sample. Table 1 summarizes the characteristics of the convenience sample, healthcare professionals that completed both pre- and post-test knowledge surveys on diabetic uropathy. Means, medians, frequencies, percentages, and ranges were used to describe key characteristics of the forty-eight participants in the sample.

The majority were from California (73%), female (73%), in the 40-49 age group (see *Figure 1*) and identified as Hispanic/Latino (42%). Nurse practitioners accounted for 46% of participants, followed by 27% registered nurses, 19% physicians, 4% physician associates/assistants, 2% advanced practice registered nurses, and 2% PhD professionals (see *Figure 2*). Forty percent have been in practice for less than or equal to five years and an overwhelming majority care for Latinos (see *Figure 3*). Seventy-nine percent of participants manage patients with diabetes. What is not depicted in the demographic summary is the participants' specialty (depicted in *Figure 4*). Prominent participant specialties were primary care and urology, but the "other" category represented the majority of participants.

Table 1 Demographic Variables

Demographic Variable	Total	Percentage
Location	n = 48	%
CA	35	73%
FL	2	4%
CO	2	4%
NC	2	4%
VA	1	2%
TX	1	2%
CT	1	2%
WI	1	2%
OH	1	2%
NJ	1	2%
Sydney Australia	1	2%
Gender		
Female	35	73%
Male	12	25%
Prefer not to answer	1	2%
Race/Ethnicity		
Latino/Hispanic	20	42%
Caucasian/White European/ Middle Eastern	11	23%
Asian	10	21%
Prefer not to answer	3	6%
African American/Black	2	4%
Mixed Race or Other	2	4%
Professional Title		
NP	22	46%
RN	13	27%
MD	9	19%
PA	2	4%
APRN	1	2%
PhD	1	2%
No. Years in Practice		
0-5	19	40%
6-10	5	10%
11-20	16	33%
20+	8	17%
Manage diabetes?		
Yes	38	79%
No	10	21%
Care for Latinos?		
Yes	44	92%
No	4	8%

Figure 1 Participant Age Groups

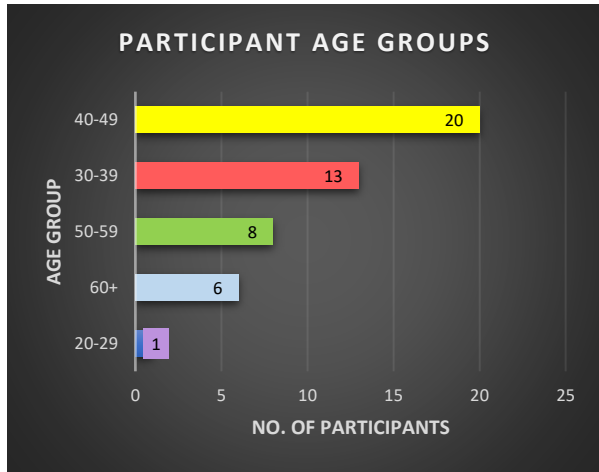


Figure 2 Participant Professional Title

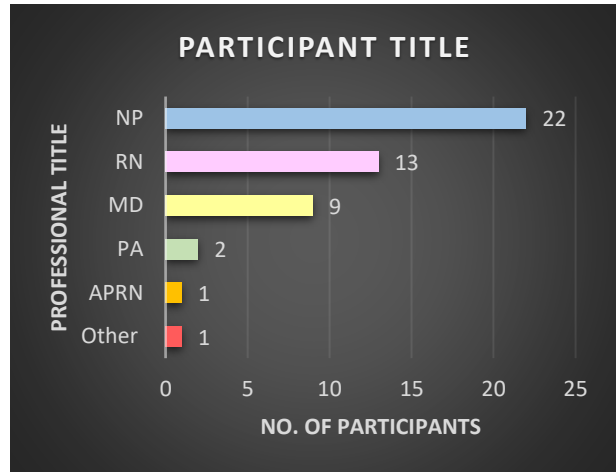


Figure 3 Participants Caring for Latinos

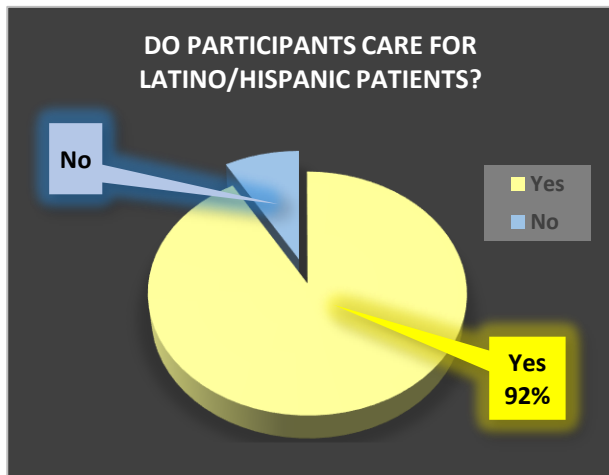
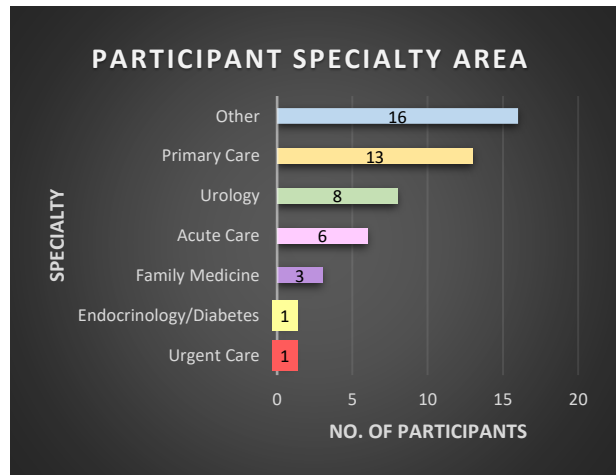


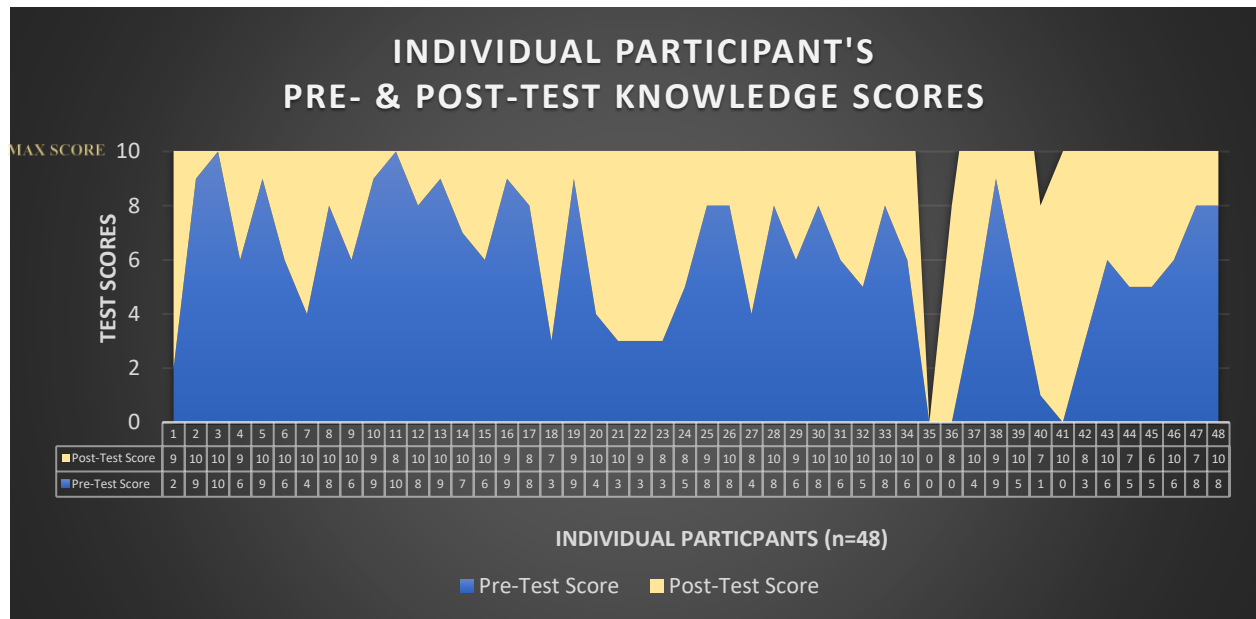
Figure 4 Participant Specialty Area



Diabetic Uropathy Knowledge Survey Scores

The primary focus of this educational intervention was to compare the knowledge of diabetic uropathy reflected by a change in pre- and post-test survey outcomes. The data was retrieved by the primary investigator from a Zoom Excel spreadsheet report. Each participant score was calculated and graphed to illustrate the knowledge scores before and after the educational session (see Figure 5). Some participants reported being unable to see or complete the surveys and were therefore excluded from the sample.

Figure 5 Participant's Individual Pre- & Post-Test Knowledge Scores



The pre- and post-test knowledge survey means (Table 2) were then calculated using Excel “Average” function and a paired *t*-Test (Table 3) was conducted using participants’ knowledge scores and Excel’s data analysis function. Table 3 shows the mean knowledge scores with standard deviation and Figure 6 illustrates the mean percentage score comparison. The mean knowledge score percentage increased from 59% to 90% after the 1-hour educational intervention. The mean knowledge scores in the pre-test surveys ($M = 5.90, SD = 2.73$) increased compared to the pre-test surveys ($M = 8.98, SD = 1.72$). A significant increase of 3.08 in mean knowledge scores ($p < 0.001$) was noted. This suggests that when healthcare professionals participate in a diabetic uropathy educational program, their knowledge increases.

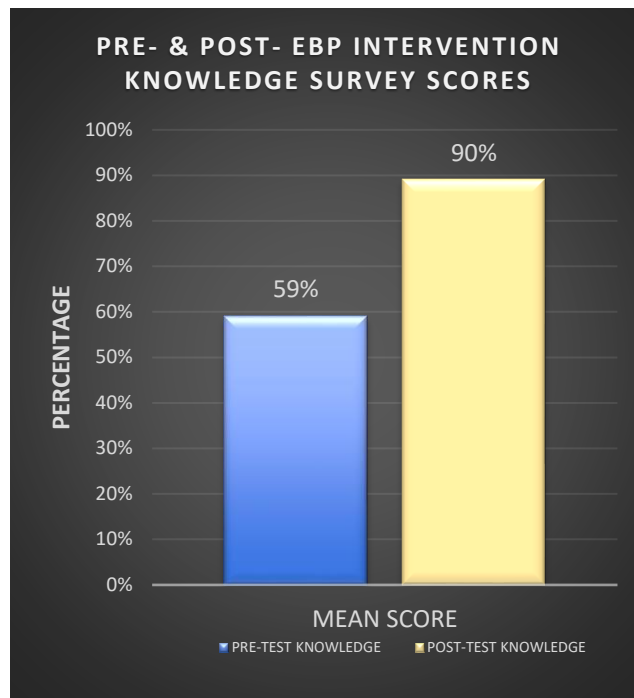
Table 2 Means and Standard Deviations

Means and Standard Deviations (n = 48)		
Variable	<i>M</i>	<i>SD</i>
Pre-Test Survey	5.90	2.73
Post-Test Survey	8.98	1.72

Table 3 Paired t-Test: Paired Two Sample for Means

t-Test: Paired Two Sample for Means		
	Pre-Test Knowledge Score	Post-Test Knowledge Score
Mean	5.89	8.97
Variance	7.45	2.95
Observations	48	48
Pearson Correlation	0.41	
Hypothesized Mean Difference	0	
Df	47	
t Stat	-8.34	
P(T<=t) one-tail	3.85E-11	
t Critical one-tail	3.27	
P(T<=t) two-tail	7.70E-11	
t Critical two-tail	3.50	

Figure 6 Mean Knowledge Score Comparison



Knowledge Scores by Topic

Each question was evaluated for knowledge means and standard deviations (Table 4) of pre- and post-intervention data. The means represent the average score participants had on each question and the variability in the data set. These *SD* calculations do not hold much value because the dichotomous variables (correct/incorrect answers) cannot hold the assumptions of a normal continuous nominal distribution. For this reason, percent increase knowledge frequencies were included in Table 4.

Table 4 Question Specific Knowledge Score Means, Standard Deviations, & Knowledge Increase

Diabetic Uropathy Knowledge Items (Correct Answer)	Pre-Test <i>M</i>	Pre-Test <i>SD</i>	Post-Test <i>M</i>	Post-Test <i>SD</i>	Mean Knowledge Increase (%)
1. Diabetic uropathy refers to bladder dysfunction, genitourinary tract infections, and sexual dysfunction.	0.67	0.48	0.94	0.24	27% ↑
2. The pathogenesis of diabetic uropathies is under-researched, multifactorial, and not well understood.	0.46	0.50	0.69	0.47	23% ↑
3. DBD refers to diabetic bladder dysfunction.	0.63	0.49	0.81	0.39	18% ↑

4.	Signs and symptoms of diabetic uropathy may include urine incontinence, nocturia, or urine frequency.	0.79	0.41	0.98	0.14	19% ↑
5.	Diabetic uropathy can lead to hydronephrosis, urine retention, and renal failure.	0.71	0.46	0.96	0.20	25% ↑
6.	Sodium-glucose cotransporter 2 (SGLT2) inhibitors have been linked to candidemia, Fournier's gangrene, and diabetic ketoacidosis.	0.19	0.39	0.75	0.44	56% ↑
7.	Urologic complication(s) of diabetes include Fournier's gangrene, emphysematous pyelonephritis, or neurogenic bladder.	0.60	0.49	0.94	0.24	36% ↑
8.	Males with diabetic uropathy may experience erectile problems, retrograde ejaculation, and functional hypogonadism.	0.52	0.50	0.90	0.31	38% ↑
9.	Females with diabetic uropathy may experience dyspareunia, decreased arousal, or vaginal dryness.	0.67	0.48	0.98	0.14	31% ↑
10.	When managing a patient with new, poorly controlled, or long-standing diabetes, the provider should perform a genital exam, screen for genitourinary symptoms, and educate patient on signs of urologic complications of diabetes.	0.71	0.46	0.96	0.20	25% ↑

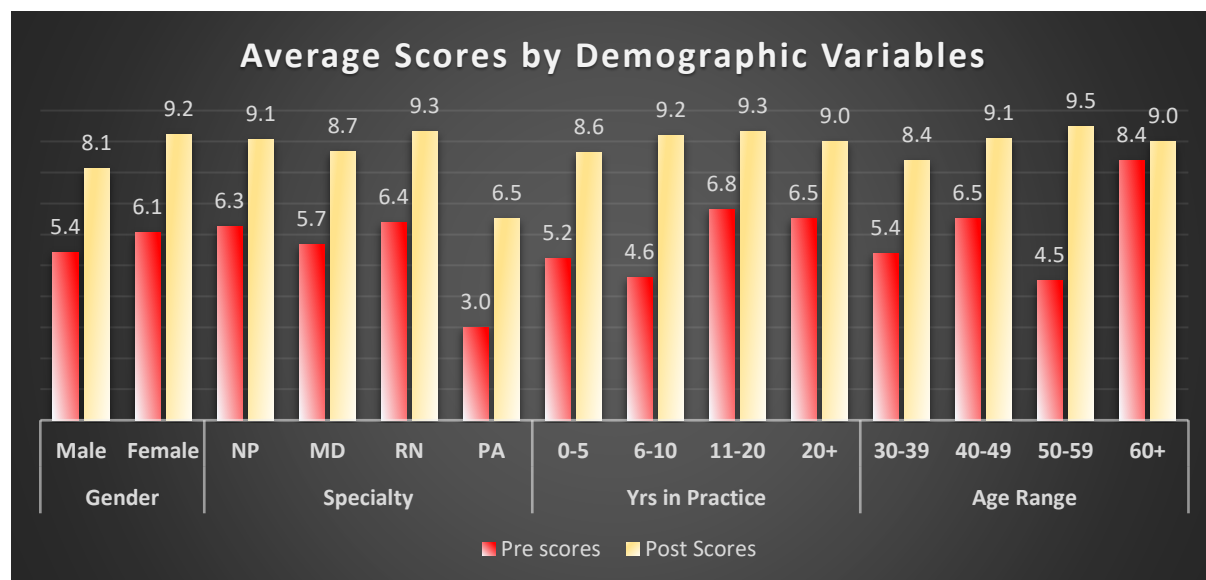
Knowledge Test Question Items

The correct pre- and post-test question items are listed in Table 4 with their respective means, standard deviations, and increase in knowledge percentage. The questions with the greatest increase (> 30%) in knowledge were items 6-9. These questions included knowledge on the adverse effects of SGLT2 inhibitors, the different types of urologic complications of diabetes, and sexual dysfunction in both sexes.

Mean Scores of Demographic Characteristics

Participant demographic characteristics were explored to identify for any difference in groups. When looking at the differences in mean scores of different demographic variables (see *Figure 7*), those that performed higher on both the pre- and post-tests were nurses, females, and participants with over 11 years in practice. For groups that had only one participant in a category, an average calculation was unable to be obtained and therefore those groups were not represented in *Figure 7*.

Figure 7 Pre & Post-Test Means by Demographic Characteristics



It is likely that participants who have been in practice longer scored higher because they have more clinical experience and exposure to diabetic sequela. It is also possible that since the majority of the nursing workforce are females, the participants have both inpatient and/or outpatient bedside experience and exposure to diabetic uropathies when caring for patients with diabetes. This may imply that they already have higher knowledge and awareness on the educational topic presented to them.

Discussion

The project supports the previous notion that knowledge of diabetic uropathies is limited. With a significant ($p < 0.001$) increase in knowledge (an average of 30%), the intervention proves to be an effective tool for increasing knowledge of diabetic uropathy among healthcare professionals serving the Latino populations. The project additionally supports the use of online platforms for successfully executing educational programs specific to the triad of diabetic uropathies effectively. The programs have potential to cross international borders (as proven by the participation of an individual from Australia) and increase knowledge of diabetic uropathy on a global level.

Implications

The implications of this EBP intervention for health care professionals, specifically primary care providers, endocrinologists, and diabetic educators, is enhanced knowledge that can be transferred to the

patient through education, health promotion, and health prevention interventions. Through effective and patient-centered communication, transfer of knowledge from provider to patient has the potential to positively influence patients' commitment to behavior modifications and self-management adherence (Freeman-Hildreth et al., 2019) that may improve glycemic levels. Concordance of patient-provider race/ethnic, gender (Takeshita et al., 2020), or language may provide added benefit.

Furthermore, increase knowledge of diabetic uropathy may enhance healthcare provider's confidence in their ability to screen for urologic complications and promptly intervene when detected. The result is improved patient care delivery that hopefully boosts clinical outcomes. High level evidence studies specific to the Latino population are warranted to explore this. Future research is needed to better delineate the pathogenesis of the full spectrum of diabetic uropathies. Studies are needed to evaluate which programs are most effective at increasing diabetic uropathy knowledge (ex. in-person versus online training) and whether they improve outcomes.

The implications for leaders and policymakers is the opportunity to develop and support policy that helps mitigate health disparities in the Latino population and other populations gravely impacted by T2D. Funding projects and programs that share the same aim is vital, as is the need to diversify the healthcare provider workforce in all disciplines. It would behoove organizations, policymakers, and providers to focus on preventative measures for the Latino communities, validate policy directions, and make diabetic uropathy a top research priority. In addition, educators should incorporate diabetic uropathy knowledge into their curriculums.

Limitations

The project had several limitations. The primary being the inability to test reliability and validity of the survey instrument due to time constraints. The second being the technical challenges registrants and participants faced while attempting to join the educational session or participate in the live knowledge surveys. This may have been due to late registration, attempting to join session after it began, or using the registration link instead of the Zoom link from confirmation email when trying to join the session. A few people reached out to notify primary investigator that they never received their confirmation or reminder emails, which may indicate a technical glitch within the Zoom Communication's platform. After the initial

session, registration settings were changed so that confirmation emails were sent immediately following registration rather than upon approval, which facilitated end-user process and improved show rate.

Sample attrition was a limitation. A few reported getting booted out of the session spontaneously and having to rejoin. This may have contributed to attrition or inability to partake in knowledge surveys. Similar projects should anticipate high attrition rates or provide clear instruction of process.

As no active educational programs were found on the triad of diabetic uropathies, a rather novel concept, both the educational program and pre- and post-test knowledge survey instruments were developed specifically for this project. Both were reviewed by context experts; however, the survey instruments should be evaluated multiple times for validity and reliability. Doing so would increase the confidence of the findings. They may be modified if necessary, perhaps making the questions more challenging as one urologist suggested.

Recommendations

It is recommended that current knowledge of diabetic uropathy be tested among health care providers managing diabetes to support the need for educational programs addressing the suspected knowledge gap. Diabetic uropathy should be incorporated into the list of common complications of diabetes and incorporated into primary care program curriculums. Task forces should consider adding diabetic uropathy to their screening guidelines. Professional organizations and associations are encouraged to add diabetic uropathy to their education material in various languages. We recommend and support efforts to diversify the healthcare provider workforce and urge financial allocation for scholarship. Expansion for research grants supporting diabetic uropathy research in the Latino populations is also recommended. Healthcare professionals should stay abreast current knowledge and emerging evidence of diabetic uropathy and translate it into practice.

Conclusion

The aim of this evidence-based project was met- improving knowledge of diabetic uropathy among healthcare professionals caring for Latinos. The EBP project builds on the limited evidence related to the entire spectrum of urologic complications of diabetes and its implications on the Latino population. It is the first to present diabetic uropathy as a “triad” of complications, one that presents prior research in

an organized and comprehensive fashion, and sheds light to the negative effects and expansive burden on the economy, the healthcare system, and the lives of Latinos living with T2D.

A review of the findings suggests a need for the adoption of educational programs to strengthen the knowledge and awareness of highly prevalent urologic complications of diabetes. Healthcare providers are vectors of knowledge and positive influence of patients' health promotion behaviors that improve T2D outcomes. Being equipped with knowledge and understanding of emerging information related to diabetic uropathies may aid in screening of preventable life-altering complications that have potential to be life threatening and deadly. Implementation of culturally appropriate services when managing diabetes in the Latino population is important for providing quality care and mitigating health disparities in this group.

Societal behavior change may ultimately improve the health of the nation, decrease morbidity and mortality, and potentially save millions in costs. This EBP project showed that an online education program is an effective tool to increase knowledge of T2D related uropathies and can reach a global audience. It is likely that similar educational programs, curtailed to patients at increased risk for developing diabetes (pre-diabetes), or who have diabetes, would be beneficial in increasing knowledge and awareness of diabetic uropathy. With the staggering global estimates expected to reach 700 million by 2045 (Saeedi et al., 2019), EBP educational programs that increase knowledge and awareness of diabetic uropathies may prove to hinder the sharp rise of diabetes. Halting T2D and its detrimental sequela is crucial for the health of the nation and the world.

References

- Agochukwu-Mmonu, N., Pop-Busui, R., Wessells, H., & Sarma, A. (2020). Autonomic neuropathy and urologic complications in diabetes. *Autonomic Neuroscience: Basic and Clinical*, 229, 1-11. <https://doi.org/10.1016/j.autneu.202.102736>.
- Aguayo-Mazzucato, C., Diaque, P., Hernandez, S. R., Rosas, S., Kostic, A., & Caballero, A. E. (2019). Understanding the growing epidemic of type 2 diabetes in the Hispanic population living in the United States. *Diabetes Metabolism Research and Reviews*, 35(2).
- American Psychological Association (APA). (2020). *Publication manual of the American Psychological Association* (7th ed.). American Psychological Association. Retrieved from <https://doi.org/10.1037/0000165-000>
- Badong, T. (2019, October 8). *Theory Evaluation of Nola Pender's Health Promotion Model* [video]. Retrieved from YouTube: <https://www.youtube.com/watch?v=FCo6XAb5dlc>
- Barbagallo, F., Mongioi, L., Cannarella, R., La Vignera, S., Condorelli, R., & Calogero, A. (2020). Sexual Dysfunction in Diabetic Women: An Update on Current Knowledge. *Diabetology*, 1(1), 11–21. doi:10.3390/diabetology1010002.
- Bartolo, C., Hall, V., Friedman, N. D., Lanyon, C., Fuller, A., Morrissey, C. O., & Athan, E. (2021). Bittersweet: infective complications of drug-induced glycosuria in patients with diabetes mellitus on SGLT2-inhibitors: two case reports. *BMC Infectious Diseases*, 20(284), 1-4. <https://doi.org/10.1186/s12879-021-05982-3>.
- Botelho, M. J., & Lima, C. A. (2020). From cultural competence to cultural respect: a critical review of six models. *The Journal of Nursing Education*. Retrieved from <https://doi.org/10.3928/01484834-20200520-03>
- Centers for Disease Control and Prevention. (2015, May 25). *Vital signs: Hispanic health*. Retrieved from CDC: <https://www.cdc.gov/vitalsigns/hispanic-health/index.html>
- Centers for Disease Control and Prevention . (2020, June 25). *Incidence of Newly Diagnosed Diabetes*. Retrieved from CDC: <https://www.cdc.gov/diabetes/data/statistics-report/newly-diagnosed-diabetes.html>

- Centers for Disease Control and Prevention . (2021, June 21). *Diabetes*. Retrieved from CDC:
<https://www.cdc.gov/diabetes/index.html>
- Centers for Disease Control and Prevention . (2021, April 7). *Hispanic / Latino Americans and Type 2 Diabetes*. Retrieved from CDC: <https://www.cdc.gov/diabetes/library/features/hispanic-diabetes.html>
- Centers for Disease Control and Prevention. (2020, July 21). *Coexisting Conditions and Complications*. Retrieved from CDC: <https://www.cdc.gov/diabetes/data/statistics-report/coexisting-conditions-complications.html>
- Coffee, R. K., Setiawan, K., Rosadi, B. A., & Lawanto, T. R. (2020). Fournier's Gangrene in a 65 years old obese female with uncontrolled type II diabetes mellitis - a case report. *Journal Bedah Nasional*, 4(1), 1-6. <https://doi.org/10.24843/JBN.2020.v04.i01.p01>.
- Daneshgari, F., Brown, J. S., Kusek, J. W., & Nyberg, L. M. (2009). Urological complications of obesity and diabetes. *The Journal of Urology*, 182(6 Suppl), <https://doi.org/10.1016/j.juro.2009.09.031>.
- Daneshgari, F., Liu, G., & Hanna-Mitchell, A. T. (2017). Path of translational discovery of urological complications of obesity and diabetes. *American Journal of Renal Physiology*, 312(5), F887-F896. doi:10.1152/ajprenal.00489.2016
- Dang, D., & Dearholt, S. L. (2018). *Johns Hopkins nursing evidence-based practice: model and guidelines* (3rd ed.). Sigma Theta Tau International.
- Dang, D., Dearholt, S., Bissett, K., Ascenzi, J., & Whalen, M. (2022). *Johns Hopkins evidence-based practice for nurses and healthcare professionals: model and guidelines* (4th ed.). Indianapolis, IN: Sigma Theta Tau International.
- Eilber, K. S. (2021, October 29). Personal communication.
- El-Qushayri, A. E., Khalaf, K. M., Dahy, A., Mahmoud, A. R., Benmelouka, A. Y., Ghozy, S., . . . Abdel-Daim, M. M. (2020). Fournier's gangrene mortality: A 17-year systematic review and meta-analysis. *International Journal of Infectious Diseases*, 92, 218-225.
<https://doi.org/10.1016/j.ijid.2019.12.030>.
- Freeman-Hildreth, Y., Aron, D., Cola, P. A., & Wang, Y. (2019). Coping with diabetes: provider attributes that influence type 2 diabetes adherence. *PLoS ONE*, 14(4). doi:10.1372/journal.pone.0214713

- Gandhi, J., Dagur, G., Warren, K., Smith, N. L., & Khan, S. A. (2017). Genitourinary Complications of Diabetes Mellitus: An Overview of Pathogenesis, Evaluation, and Management. *Current Diabetes Reviews*, 13(5), 498–518. <https://doi.org/10.2174/1573399812666161019162747>.
- Gomella, L. G., Andriole, G. L., Burnett, A. L., Flanigan, R. C., Keane, T. E., Koo, H. P., . . . Thomas, R. (Eds.). (2015). *The 5-minute urology consult 3rd edition*. (3rd ed.). Wolters Kluwer Health.
- Gonzalo, A. (2021, March 5). *Nola Pender: Health Promotion Model*. Retrieved from Nursealabs: <https://nurseslabs.com/nola-pender-health-promotion-model/#:~:text=Pender%E2%80%99s%20health%20promotion%20model%20defines%20health%20as%20%E2%80%9Ca,they%20interact%20within%20the%20environment%20to%20pursue%20health.>
- Gupta, L., Prakash, S., Khandelwal, D., Kalra, B., & Kaira, S. (2018). Diabetes and female sexual dysfunction. *US Endocrinology*, 14(1), 35-38. doi:<https://doi.org/10.17925/USE.2018.14.1.35>
- He, Z., Yin, G., Li, Q. Q., Zeng, Q., & Duan, J. (2021). Diabetes mellitus causes male reproductive dysfunction: a review of the evidence and mechanisms. *In Vivo*, 35, 1503-2511. doi:10.21873/invivo.12531
- Healthy People 2030. (n.d.). *Social Determinants of Health*. Retrieved May 5, 2021, from U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion: <https://health.gov/healthypeople/objectives-and-data/social-determinants-health>
- Hughes Jr, F. M., Hirshman, N. A., Inouye, B. M., Jin, H., Stanton, E. W., Yun, C. E., . . . Purves, J. T. (2019). NLRP3 diabetic bladder dysfunction and changes in symptom-specific bladder innervation. *Diabetes*, 68, 430-440. <https://doi/10.2337/db.18-0845>.
- Inouye, B. M., Hughes, F. M., Jin, H., Lütolf, R., Potnis, K. C., Routh, J. C., . . . Purves, J. T. (2018). Diabetic bladder dysfunction is associated with bladder inflammation triggered through hyperglycemia, not polyuria. *Res Rep Uro*, 10, 219-225. <https://doi.org/10.2147/RRU.S177633>.
- Iwamoto, H. I., Anno, T., Takenouchi, H., Takahashi, K., Horiya, M., Kimura, Y., . . . Kaneto, H. (2021). Case report: emphysematous cystitis and pyelonephritis induced by uterine prolapse in a subject with untreated Diabetes Mellitus. *Frontiers in Medicine*, 1-6. doi:10.3389/fmed.2021.658682

- Jegadish, N., Fernandes, S. D., Narasimhan, M., & Ramachandran, R. (2021). A descriptive study of the clinical and etiological profile of balanoposthitis. *Journal of Family Medicine and Primare Care*, 10(6), 2265-2271. doi:10.4103/jfmpc.jfmpc_2467_20
- Jones, N., Marks, R., Ramirez, R., & Rios-Vargas, M. (2021, August 12). *2020 Census Illuminates Racial and Ethnic Composition of the Country*. Retrieved from United States Census Bureau: <https://www.census.gov/library/stories/2021/08/improved-race-ethnicity-measures-reveal-united-states-population-much-more-multiracial.html>
- Joseph, P. (2016, October). Conceptual application of Pender's Health Promotion Model in the promotion of adolescent mental health and coping abilities through school teachers. *International Journal of Innovative Research and Advanced Studies (IJIRA)*, 3(11), 72-74. http://www.ijiras.com/2016/Vol_3-Issue_11/paper_12.pdf.
- Julliard, K., Vivar, J., Delgado, C., Cruz, E., Kabak, J., & Sabers, H. (2008). What Latinas patients don't tell their doctors: a qualitative study. *The Annals of Family Medicine*, 6(6), 543-549. doi:<https://doi.org/10.1370/afm.912>
- Kalra, B., & Kalra, S. (2017). Vulvovaginitis and diabetes. *The Journal of the Pakistan Medical Association (JPMA)*, 67(1), 143–145. https://jpma.org.pk/article-details/8063?article_id=8063.
- Khan, M., Salahuddin, A. M., Nawaz, A., Shoaib, M., Samad, A., Nawaz, H., . . . Khan, S. (2020). Xanthogranulomatous pyelonephritis: presentation and surgical complications. *The Professional Medical Journal*, 27(7), 1391-1395. doi:10.29309/TPMJ/2020.27.07.3965
- Kirby, M. (2021). How to diagnose and manage erectile dysfunction in men with diabetes. *Diabetes & Primary Care*, Vol 23 No 4. <https://diabetesonthenet.com/diabetes-primary-care/how-to-diagnose-and-manage-erectile-dysfunction-in-men-with-diabetes/>.
- Klee, N. S., Moreland, R. S., & Kendig, D. M. (2019). Detrusor contractility to parasympathetic mediators is differentially altered in the compensated and decompensated states of diabetic bladder dysfunction. *American Journal of Physiology: Renal Physiology*, 317(2), F388-F398. doi:10.1152/ajprenal.00178.2019

- Kuttiappan, A., Dondapati, S. P., Kothinti, T., Bayyapureddy, M., Kothapalli, J., & Balaji, A. (2021). A retrospective study on antibiotic microbial sensitivity in type II diabetes mellitus patients with urinary tract infections. *Journal of Young Pharmacists*, 13(1), 63-67.
- Lekas, H.-M., Pahl, K., & Fuller Lewis, C. (2020). Rethinking cultural competence: shifting to cultural humility. *Health services insights*, 13. doi:10.1177/1178632920970580
- Liu, G., & Daneshgari, F. (2014). Diabetic bladder dysfunction. *Chinese Medical Journal (Engl)*, 127(7), 1357-1364.
- Mayo Clinic. (2021, February 11). Gangrene: symptoms and causes. <https://www.mayoclinic.org/diseases-conditions/gangrene/symptoms-causes/syc-20352567>.
- Moon, J. Y., Lee, M. R., Kim, J. H., & Ha, G. W. (2021). Fournier Gangre in a patient with type 2 diabetes mellitus treated with dapagliflozin: a case report. *Annals of Coloproctology*, 37(Suppl 1), S48-S50. <https://doi.org/10.3393/ac.2020.06.22>.
- Morales, J., Glantz, N., Larez, A., Bevier, W., Conneely, M., Fan, L., . . . Kerr, D. (2020). Understanding the impact of five major determinants of health (genetics, biology, behavior, psychology, society/environment) on type 2 diabetes in U.S. Hispanic/Latino families: mil familias - a cohort study. *BMC Endocrine Disorders*, 20(4), 2-13. <https://doi.org/10.1186/s12902-019-0483-z>.
- Mostafa, T., & Abdel-Hamid, I. A. (2021). Ejaculatory dysfunction in men with diabetes mellitus. *World Journal of Diabetes*, 12(7), 954-974. doi:10.4239/wdj.v12.i7.954
- Naik, S., & Anemajal, S. (2021). A study of asymptomatic bacteriuria in patients with diabetes mellitus. *International Journal of Advanced Research in Medicine*, 131-133. <https://doi.org/10.22271/27069567.2021.v3.ilc.113>.
- National Healthcare Safety Network (NHSN). Centers for Disease Control (CDC). (2021, January). *Patient safety component manual. Chapter 7: Urinary tract infection (catheter associated urinary tract infection [CAUTI] and non-catheter-associated urinary tract infection [UTI] events)*. 7-2 – 7-8 <https://www.cdc.gov/nhsn/psc/index.html>.
- National Institute of Diabetes and Digestive and Kidney Disease (NIDDK). (2020, December). *Diabetes statistics*. Retrieved from National Institute of Health (NIH): <https://www.niddk.nih.gov/health-information/health-statistics/diabetes-statistics>

- Noe-Bustamante, L. (2019). *Key facts about U.S. Hispanics and their diverse heritage*. Retrieved from Pew Research Center: <https://www.pewresearch.org/fact-tank/2019/09/16/key-facts-about-u-s-hispanics/>
- Office of Minority Health. (2021, March 1). *Diabetes and Hispanic Americans*. Retrieved from US Department of Health & Human Services: <https://www.minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=63>
- Office of Minority Health. (2021, April 12). *Profiles: Hispanic/Latino Americans*. Retrieved from US Department of Health & Human Services: <https://www.minorityhealth.hhs.gov/omh/browse.aspx?lvl=3&lvlid=64>
- Okafor, C. N., & Onyeaso, E. E. (2021, August 29). Perinephric abscess. In: *Stat Pearls*, Stat Pearls Publishing, <https://pubmed.ncbi.nlm.nih.gov/30725621/#:~:text=A%20perinephric%20abscess%20is%20more%20diffuse%20and%20affects,the%20pelvis.%20Copyright%20%C2%A9%202021%2C%20StatPearls%20Publishing%20LLC.>
- Okuroğlu, G. K., & Alpar, Ş. E. (2019). Effect of Web-based diabetes training program on diabetes-related knowledge, attitudes, and skills of health professionals: a randomized controlled trial. *JJNS*, 16(2), 184–193. doi:10.1111/jjns.12228
- Pais, V. M., Santora, T. A., Rukstalis, D. B., & Sollender, G. E. (2021, June 3). *Fournier Gangrene Clinical Presentation*. (B. F. Schwartz, Editor) Retrieved from Medscape: <https://emedicine.medscape.com/article/2028899-clinical>
- Pender, N. J. (1996). Health Promotion Model – diagram. Retrieved from <https://hdl.handle.net/2027.42/85351>
- Pender, N. J., Murdaugh, C. L., & Parsons, M. A. (2011). *The Health Promotion Model: manual* (6th ed.). Boston, MA: Pearson. Retrieved from University of Michigan Library: https://deepblue.lib.umich.edu/bitstream/handle/2027.42/85350/HEALTH_PROMOTION_MANUAL_Rev_5-2011.pdf?sequence=1&isAllowed=y
- Radcliffe, R. S., & Khan, M. A. (2020). Mortality associated with Fournier's gangrene remains unchanged over 25 years. *BJU international*, 125(4), 610–616. <https://doi.org/10.1111/bju.14998>.

- Ray, S., & Pramanik, S. (2020). Reproductive dysfunctions in males with type 2 diabetes mellitus: an updated review. *EMJ Diabetes*, 8(1), 79-89.
<https://www.emjreviews.com/diabetes/article/reproductive-dysfunctions-in-males-with-type-2-diabetes-mellitus-an-updated-review>.
- Reznichak, R. C. (2021, November 1). Personal communication.
- Rind, D. H., Shah, A., Bozdar, A. G., Sohu, K. M., Ayoob, M., & Arshad, S. (2010). Fournier's gangrene: a life threatening surgical emergency. *Medical Channel*, 16(2), 339-342.
<http://medicalchannel.pk/downloads/vol16/no2/FOURNIER%20GANGRENE.pdf>.
- Rivera-Alvarez, F., George, A., & Ganti, L. (2021). Massive necrotizing Fournier's Gangrene. *Urology Case Reports*, 38, 1-3. <https://doi.org/10.106/j.eucr.2021.101689>.
- Sabih, A., & Leslie, S. W. (2021). Complicated Urinary Tract Infections. *In StatPearls*, <https://pubmed.ncbi.nlm.nih.gov/28613784/>.
- Sadikot, S. M., Das, A. K., Wilding, J., Siyan, A., Zargar, A. H., Saboo, K. K., . . . Kesavadev, J. (2017). Consensus recommendations on exploring effective solutions for the rising cost of diabetes. *Diabetes & Metabolic SyndromeL Clinical Research & Reviews*, 11, 141-147.
<http://dx.doi.org/10.1016/j.dsx.2017.03.002>.
- Saeedi, P., Petersohn, I., Salpea, P., Malanda, B., Karuranga, S., Unwin, N., . . . Committee, O. b. (2019). Global and regional diabetes prevalence estimates for 2019 and projections for 2030 and 2045: results form the International Diabetes Federation Diabetes Atlas, 9th edition. *Diabetes Research and Clinical Practice*, 157, 1-10. <https://doi.org/10.1016/j.diabres.2019.107843>.
- Shin, Y. S., On, J. W., & Kim, M. K. (2016). Clinical significance of diabetes mellitus on detrusor functionality on stress urinary incontinent women without bladder outlet obstruction. *Int Urogynecol J*, 27, 1557-1561. doi:10.1007/s00192-016-2997-5
- Squires, A. (2018). Strategies for overcoming language barriers in healthcare. *Nursing Management*, 49(4), 20-27. doi:10.1097/01.NUMA.0000531166.24481.15
- Stone, R. I. (2019). Investing in the social dimensions of health. *Generations: Journal of the American Society of Aging*, 63-68. <https://online.flippingbook.com/view/115850/>.

- Suzuki, K., Yamaguchi, T., & Yanai, M. (2018). Simultaneous occurrence of hypermucoviscous *Klebsiella pneumoniae* emphysematous prostatic abscess, emphysematous cystitis, and renal abscess. *ID Cases*, 1-3. <https://doi.org/10.1016/j.idcr.2018.e00464>.
- Takeshita, J., Wang, S., Loren, A. W., Mitra, N., Shults, J., Shin, D. B., & Sawinski, D. L. (2020). Association of racial/ethnic and gender concordance between patients and physicians with patient experience ratings. *JAMA Network Open*, 3(11), 1-13.
doi:10.1001/jamanetworkopen.2020.24583
- Turnbull, J., Arenth, J., Payne, K., Lantos, J. D., & Fanning, J. (2019). When Only Family Is Available to Interpret. *Pediatrics*, 143(4). doi:10.1542/peds.2018-3700
- U.S. Food and Drug Administration (FDA). (2020, April 10). *Fighting Diabetes' Deadly Impact on Minorities*. Retrieved from <https://www.fda.gov/consumers/consumer-updates/fighting-diabetes-deadly-impact-minorities>.
- United States Census Bureau. (2018, October 9). *Hispanic Population to Reach 111 Million by 2060*. Retrieved from <https://www.census.gov/library/visualizations/2018/comm/hispanic-projected-pop.html>
- United States Census Bureau. (2019, September). *Income and poverty in the United States: 2019*. . Retrieved from <https://www.census.gov/data/tables/2020/demo/income-poverty/p60-270.html>
- Valdez, L. A., Morrill, K. E., Griffith, D. M., Lindberg, N. M., Hooker, S. P., & Garcia, D. O. (2019). Mexican origin Hispanic men's perspectives of physical activity-related health behaviors. *American Journal of Men's Health*, 13(1), 1-11. doi:10.1177/1557988319834112
- Verma, S. B., & Wollina, W. (2011). Looking through the cracks of diabetic candida balanoposthitis. *International Journal of General Medicine*, 4, 511-513. <http://dx.doi.org/10.2147/IJGM.S17875>.
- Wessells, H., Braffett, B. H., Holt, S. K., Jacobson, A. M., Kusek, J. W., Cowie, C., . . . (2018). Burden of urological complications in men and women with long-standing type 1 diabetes in the diabetes control and complications trial/epidemiology of diabetes interventions and complications cohort. *Diabetes Care*, 41(10), 2170–2177. <https://doi.org/10.2337/dc18-0255>.
- Wieder, J. A. (2014). *Pocket guide to urology* (5th ed.). J. Wieder Medical.

- Wilbur, K., Snyder, C., Essary, A. C., Reddy, S., Will, K. K., & Saxon, M. (2020). Developing Workforce Diversity in the Health Professions: A Social Justice Perspective. *Health Professions Education*, 6(2), 222-229. Retrieved from <https://doi.org/10.1016/j.hpe.2020.01.002>
- Winkley, K., Kristensen, C., & Fosbury, J. (2021). Sexual health and function in women with diabetes. *Diabetic Medicine: a journal of the British Diabetic Association*, <https://doi.org/10.1111/dme.14644>.
- Wittig, L., Carlson, K. V., Andrews, J. M., Crump, R. T., & Baverstock, R. J. (2019). Diabetic bladder dysfunction: a review. *Urology* 123, 1-6. <https://doi.org/10.1016/j.urology.2018.10.010>.
- Wood, E. L. (2021, October 29). Personal Communication.
- World Population Review. (2021). *Hispanic population by State 2021*. Retrieved from <https://worldpopulationreview.com/state-rankings/hispanic-population-by-state>
- Yunus, B. (2014, November 29). *Fournier's Gangrene*. [PowerPoint slides]. Slide Share. <https://www.slideshare.net/bashirbnyunus/fourniers-gangrene-42157963>.

Appendices

Appendix A: Demographic Survey

Meeting Registration



Topic Urologic Complications of Diabetes

Time Oct 23, 2021 10:00 AM in Pacific Time (US and Canada)



First Name*

Last Name

Email Address*

Confirm Email Address*

Zip/Postal Code*

State/Province*

What is your gender*

What is your race or ethnicity? (Optional, you can decline to state)*

What is your title?*

Number of years in practice*

Do you provide care to patients with diabetes?*

Do you care for Latino/Hispanic patients?*

What is your specialty?*

What is your age group?*

Questions & Comments

* Required information

Information you provide when registering will be shared with the account owner and host and can be used and shared by them in accordance with their Terms and Privacy Policy.

Register

Appendix B: Clarion IRB Committee Letter**Institutional Review Board, Clarion University**RE: IRB Application No. N/APrincipal Investigator(s) Lucia Diaz

As acting Chair of Clarion University of Pennsylvania's IRB, I have reviewed the above IRB application. The proposed project meets the IRB's guidelines for evidence-based projects and, as such, does not require IRB review.


Jennifer L. Boyer, JD, PhD

October 30, 2021

Date

Appendix C: Personal Communications

Re: Lucia project

Oct 29 at 3:26 PM

[PrintRaw message](#)

Wood, Erika L. [REDACTED]

To: Idiaz [REDACTED]

Yes, you may use this email as reference.

"Valid" and "validated" are very specific terms in survey methodology - I would say the survey was peer reviewed and informed by literature review

Sent from my iPhone

On Oct 29, 2021, at 3:07 PM, Idiaz [REDACTED] wrote:

CAUTION - EXTERNAL EMAIL: Do not click links or open attachments unless you recognize the sender.

Thank you, Erika!

It means so much coming from an exceptional urologist. May I use this email as a personal communication citation for my project/paper to indicate that it is a peer-reviewed intervention and that the pre/post-test is a valid tool to test the knowledge of urologic complications of diabetes aka diabetic uropathy?

I will be using animation/fly-in to break up the bullet points and will change SDOH to social determinants of health as you suggest.

Do you agree the pre- and post-test is a valid tool to test knowledge of diabetic uropathies?

Best,
Lucia

On Friday, October 29, 2021, 02:22:41 PM PDT, Wood, Erika L. [REDACTED] wrote:

Lucia,

Absolutely stellar! I learned so much, thank you for your hard work on this. I love the concept of a diabetic "uropathy" and it makes so much sense in the context of our patients and the lack of PCP knowledge regarding the consequences of poorly controlled diabetes on the GU system. We both know how much our men in particular are personally affected by the sexual dysfunction and how motivating this can be - I anticipate that would be a very intervenable area if more PCPs tell pre-diabetics they could lose their erections....

I have no edits other than the sexual dysfunction slides are a little wordy - are you using an actions/fly-ins to break up the bullets? Also, I would spell out social determinants of health before putting SDOH as a stand alone bullet.

Great work, you're a star.

Erika L. Wood, MD, MPH
[REDACTED]

Eilber, Karyn MD [REDACTED]
Sat 10/30/2021 7:34 AM

To: Lucia Diaz

[External]: This email originated from outside of Clarion University.

Of course

Sent from my iPhone

On Oct 29, 2021, at 9:43 PM, Lucia Diaz [REDACTED] wrote:

As long as your knowledge increased, Dr. Eilber! Bet you would still get 100%!
Would it be okay to use your emails to cite as a communication reference for my project/paper?
Appreciate you! Thanks again!!

Best,
Lucia

From: Eilber, Karyn MD [REDACTED]
Sent: Friday, October 29, 2021 9:36 PM
To: Lucia Diaz [REDACTED]
Subject: Re: [External] Lucia Diaz DNP Project

[External]: This email originated from outside of Clarion University.

I do, but to be honest I thought it was a little hard 😊

Sent from my iPhone

On Oct 29, 2021, at 8:41 PM, Lucia Diaz [REDACTED] wrote:

Thank you for the feedback, Dr. Eilber! Getting validation from such a distinguished urologist is very reassuring. Thank you for taking the time to review.

Do you think the pre- and post-test developed would be an effective tool to test the knowledge on diabetic uropathies?

Lucia Diaz

From: Eilber, Karyn MD [REDACTED]
Sent: Friday, October 29, 2021 7:51 PM
To: Lucia Diaz [REDACTED]
Subject: RE: [External] Lucia Diaz DNP Project

[External]: This email originated from outside of Clarion University.

Looks great—I learned something

Karyn S. Eilber, MD
Female Pelvic Medicine & Reconstructive Surgery
Chair, Cedars-Sinai Medical Group Department of Surgery

Program Director, Cedars-Sinai FPMRS Fellowship
Associate Program Director, Cedars-Sinai Urology Residency Training Program
Professor, Urology
Associate Professor, Obstetrics & Gynecology

[REDACTED]

From: Lucia Diaz [REDACTED]
Sent: Friday, October 29, 2021 4:56 PM
To: Eilber, Karyn MD [REDACTED]
Subject: [External] Lucia Diaz DNP Project

Hi Dr. Eilber,

I'm currently working on my doctoral project and have developed an educational intervention geared toward primary care providers. My goal is to increase knowledge and awareness of urologic complications of diabetes. I've outlined the wide spectrum of conditions into three different categories and used "diabetic uropathies" as the umbrella term for all urologic complications of diabetes.

Attached is the pre- and post- intervention knowledge test I developed. I kindly ask for a peer-review to see if the pre/post test is an effective tool to test knowledge of diabetic uropathies. Since there is no developed and validated survey yet developed, I had to create my own. I've also attached the PowerPoint slides of the educational program on PDF for reference.

Please let me know what you think and if I can use these emails as a communication reference for my final project paper and presentation. Thanks so much!

Best,
Lucia Diaz, MSN, ANP-BC, CUNP

From: R C Reznichek [REDACTED]
Sent: Wednesday, November 3, 2021 10:08 AM
To: Lucia Diaz [REDACTED]
Subject: Re: Lucia DNP Project

[External]: This email originated from outside of Clarion University.

Sure. You can use them.

Ricardo

On Nov 3, 2021, at 1:32 AM, Lucia Diaz [REDACTED] wrote:

Hi Dr. Rez,

Thanks for your input! Will change the typo. The CT image is overlapped with an image I obtained from a pathology website that has it labeled as bilateral hydronephrosis. Underneath the overlap, the CT images shows a hydronephrotic kidney which you can't see on the PDF, but will show during slide show. I like the option of adding "not certain" to the knowledge survey answers to get an honest opinion rather than a guess (should participants not know the answer). I was told the survey was a bit hard, so don't want to make it any more challenging.

Thanks for taking the time to review. Really appreciate it. I dedicate this presentation to you, Dr. Rez! Not only for training me, but for modeling how to be a humble and caring provider who truly cares for the community.

Do I have your permission to use these emails as a communication reference to cite for my paper/project?

Thanks,
Lucia

From: R C Reznichek [REDACTED]
Sent: Monday, November 1, 2021 9:33 PM
To: Lucia Diaz [REDACTED]
Subject: Fwd: Lucia DNP Project

[External]: This email originated from outside of Clarion University.

Hola
Great slide show and beautiful picture of you at the end!

I noticed two small things that could be changed.
Slide 10: Xray on the right does not show hydronephrosis (it only shows dilated distal ureters).
Slide 12: In one place the word balanoposthitis has an added *p* that needs to be removed

The knowledge survey may be the style you wish but there is no challenge.
Could it be more challenging and helpful if some of the answers where other than "all of the above"?

Salud!
Ricardo

From: Lucia Diaz [REDACTED]
Subject: Fw: Lucia DNP Project
Date: October 30, 2021 at 4:56:26 PM PDT
To: "reznichek" [REDACTED]

Dear Dr. Reznichek,

I'm currently working on my doctoral project and have developed an educational intervention geared toward primary care providers. My goal is to increase knowledge and awareness of urologic complications of diabetes. I've outlined the wide spectrum of conditions into three different categories and used "diabetic uropathy" as the umbrella term for all urologic complications of diabetes.

Attached is the pre- and post- intervention knowledge test I developed. I kindly ask for a peer-review to see if the pre/post test is an effective tool to test knowledge of diabetic uropathies. Since there is no validated survey yet developed, I had created my own. I've also attached the PowerPoint slides of the educational program on PDF for reference.

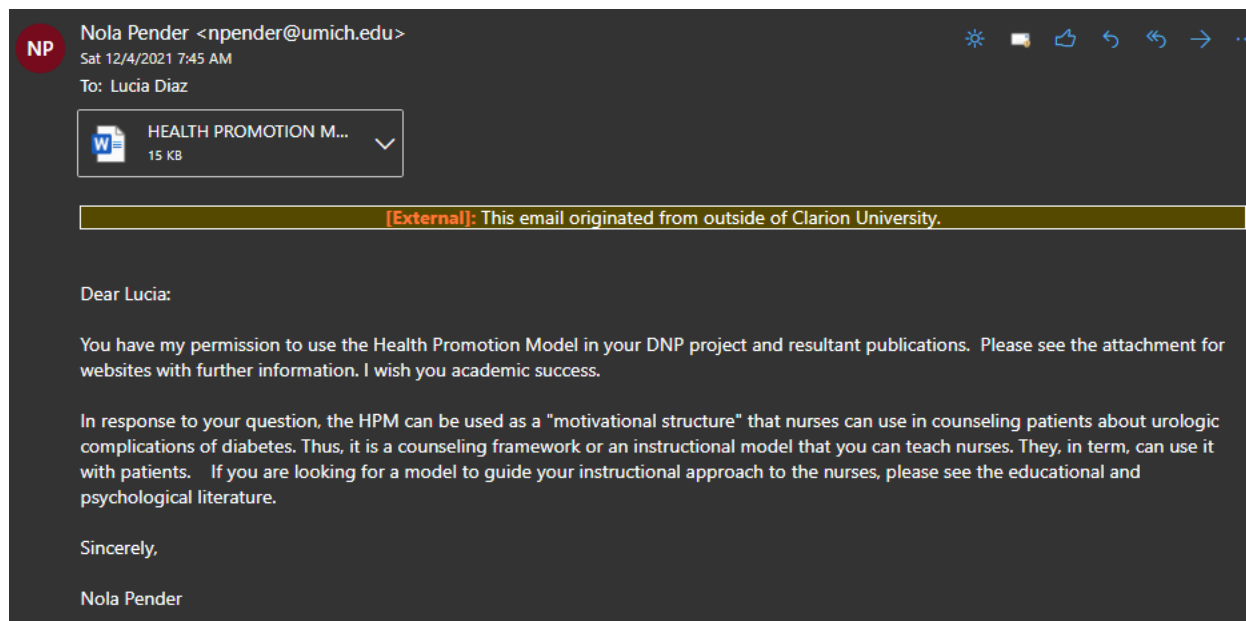
Please let me know what you think this knowledge survey is an appropriate tool to test knowledge of diabetic uropathy and if I can use these emails as a communication reference for my final project paper and presentation. Thanks so much!

Best,
Lucia Diaz, MSN, ANP-BC, CUNP

Appendix D: Pre- & Post-Test Knowledge Survey Questions

1. Diabetic uropathy refers to
 - a. bladder dysfunction
 - b. genitourinary tract infections
 - c. sexual dysfunction
 - d. all of the above
 - e. none of the above
 - f. uncertain
2. The pathogenesis of diabetic uropathies
 - a. is under-researched
 - b. is multifactorial
 - c. is not well understood
 - d. all of the above
 - e. none of the above
 - f. uncertain
3. DBD refers to
 - a. Diabetic Bulbar Disorder
 - b. Disruptive Balanitis Dysfunction
 - c. Diabetic Bladder Dysfunction
 - d. all of the above
 - e. none of the above
 - f. uncertain
4. Signs and symptoms of diabetic uropathy may include
 - a. urine incontinence
 - b. nocturia
 - c. urine frequency
 - d. all of the above
 - e. none of the above
 - f. uncertain
5. Diabetic uropathy can lead to
 - a. hydronephrosis
 - b. urine retention
 - c. renal failure
 - d. all of the above
 - e. none of the above
 - f. uncertain
6. Sodium-glucose cotransporter 2 (SGLT2) inhibitors have been linked to
 - a. candidemia
 - b. Fournier's gangrene
 - c. diabetic keto acidosis
 - d. all of the above
 - e. none of the above
 - f. uncertain
7. Urologic complication(s) of diabetes include
 - a. Fournier's Gangrene
 - b. emphysematous pyelonephritis
 - c. neurogenic bladder
 - d. all of the above
 - e. none of the above
 - f. uncertain
8. Males with diabetic uropathy may experience
 - a. erectile problems
 - b. retrograde ejaculation
 - c. functional hypogonadism
 - d. all of the above
 - e. none of the above
 - f. uncertain
9. Females with diabetic uropathy may experience
 - a. dyspareunia
 - b. decreased arousal
 - c. vaginal dryness
 - d. all of the above
 - e. none of the above
 - f. uncertain
10. When managing a patient with new, poorly controlled, or long-standing diabetes, the provider should
 - a. perform a genital exam
 - b. screen for genitourinary symptoms
 - c. educate patient on signs of urologic complications of diabetes
 - d. all of the above
 - e. none of the above
 - f. uncertain

Appendix E: Nola Pender's Permission to Use HPM



Appendix F: Signed Title Page for Approved Dissertation

**THE TRIAD OF DIABETIC UROPATHY:
AN EVIDENCE-BASED PRACTICE EDUCATIONAL INTERVENTION
FOR HEALTHCARE PROFESSIONALS CARING FOR
THE LATINO/HISPANIC POPULATIONS**

By

Lucia Diaz, ANP-BC, CUNP

DNP, Clarion and Edinboro Universities, 2021
MSN, Johns Hopkins University SON, 2008
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BS, Microbiology, San Diego State University, 2003

A DNP Project Submitted to Clarion and Edinboro Universities
In Partial Fulfillment of the Requirements for the Doctor of Nursing Practice Degree
December 2021

12/10/2021

Date

Lauri Paic, MSN, PhD, RN

Committee Chair

12/10/2021

Date

Donna Falsetti, DrPH, CRNP

Committee Member

12/10/2021

Date

Dinelle Kinsley, DNP, MSN, RN, CNE

Committee Member

12/13/21

Date

Myra Rice

Dean, College of Education, Health and Human Services
Clarion University