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Health Care Providers' Experiences with Integrated Care Services Needed to Treat Patients With Type 3 Compared to Type 2 Diabetes

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Abstract

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MHA, University of Phoenix, 2006

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Dissertation Submitted in Partial Fulfillment

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Abstract

Type 3 diabetes (T3D) is a neglected medical anomaly that lacks documentation on how physicians care for patients with the condition. Alzheimer's and diabetes are diseases prevalent in older populations, the unfamiliarity of T3D can lead to nontreatment or inappropriate care, the nondescript ailment can be negatively responsive to a society that is rapidly aging. This study was a general qualitative interview-based inquiry to explore medical providers' experiences with the health care services and costs associated with treating patients with T3D compared to T2D. This grounded theory research was grounded in social cognitive and relational coordination theories. Participants were seven clinical providers who were interviewed to collect firsthand information and their experiential knowledge on the topic. Data were categorized and themes developed from the categories. Participants indicated they provided preventative or tertiary diabetes management and education to their patients and their families, and most identified wrap around services as essential. Although the participants applied the standard of care for T2D, they had limited experience in treating patients with T3D and they were hesitant in treating patients with cognitive issues. Insurance companies were identified as a barrier to treatment. Given the severity of T3D, it has the potential to be increasingly costly to the health care system. The findings have the potential to contribute to positive social change by increasing awareness of a relatively unknown medical issue that is expected to increase in severity as the world's population ages, and this awareness may help decrease the overall cost of care.

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Dedication

First, I dedicate this journey to my Lord and Savior, Jesus Christ; praise God, HE pulled me through. Next, I dedicate this page to my loving and supportive son, Daniel Isaiah Rivera; I want to say thank you, son, for being there for me and being my biggest advocate and cheerleader. I also want to thank my father, James Curtis Jaycox Sr., and my mother, Mary Irine Jaycox, for always being my source of encouragement and support.

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Special thanks to my committee chair, Dr. Denise Rizzolo, for the endless support and guidance and for being there at all hours, every day, even during semester breaks. Thank you, Dr. Rizzolo, for the encouragement when I needed that extra push. To my second committee member, Dr. David Segal, thank you for your constructive criticism and for always keeping me on my toes; I knew you had my best interest in mind, and the results speak for themselves. I would also like to acknowledge the qualitative methodologist, Dr. Morris; thanks for being there for me from the start of my dissertation journey. Finally, I would like to acknowledge my friend Mel Hannah. Mel always introduced me as Dr. Jaycox; when I tried to discourage him, he kept doing it and told me I'd be a doctor. Rest in Heaven, my friend; you were right; I did it; I am Dr. Sharon Hope Jaycox.

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Chapter 1: Introduction to the Study

According to the Centers for Disease Control and Prevention (CDC; 2020), over 34 million people in the United States have diabetes. The Non-Communicable Diseases Risk Factor Collaboration (2016) reported the global population with diabetes is 422 million people. This number increased from 108 million in 1980 and is expected to increase to 642 million by 2040 (Ogurtsova et al., 2017). The CDC (2020) showed the total cost of diabetes in the United States was $327 billion, which has risen from $188 billion in 2012. Although the Non-Communicable Diseases Risk Factor Collaboration (2016) posited diabetes prevalence is due to factors, such as age and race, the authors also noted that people with diabetes are at a higher risk for other comorbidities, such as Alzheimer’s. The Alzheimer’s Association (AA, 2021) explained that, like diabetes, Alzheimer’s is a chronic ailment that progressively worsens with age. It is a disease that may lead to cognitive decline, memory loss, or dementia. Gennip et al. (2021) reported that people with diabetes had a higher risk of developing dementia, stating that the risk increases to almost 2 times higher than those without a diabetes diagnosis. Notably, the cost of care for diabetes and Alzheimer’s will increase significantly over the next few years (AA, 2021; ADA, 2021).

Diabetes and Alzheimer’s jointly form a marginally recognized disorder, Type 3 diabetes (T3D; Leszek et al., 2017). Research has shown that people with diabetes have a greater chance of mental complications or progression to Alzheimer’s (ADA, 2021). Therefore, as society ages, providers in medical facilities, such as endocrinology and neurological practices, will face an increase in patients with diabetes presenting with mental decline. Looking at the current research, the scientific basis of T3D is slowly becoming acceptable, thus making a correlation between diabetes and Alzheimer's, prescribing a physiological interaction between insulin and neurological factors. Unfortunately, given the limited information on the anomaly, there is no definitive diagnosis for T3D, so without a prescribed diagnosis or recognized acknowledgment as a disease, a T3D care plan has not been readily established. There are care plans and health service recommendations for some of the other recognized forms of diabetes, such as Type 1 and gestational diabetes, yet as noted above, no treatment, preventions, or standards are in place to care for those with T3D.

Type 2 diabetes (T2D) management requires clinical and nonclinical interventions that often involve integrating or coordinating services, such as working with nutritionists, diabetes educators, or pharmacists (ADA, 2021). For diagnosed forms of diabetes, such as T2D, the care recommendations come from established guidance found in the chronic care model or as prescribed in the diabetes standard of care (ADA, 2021). While there are no published treatments or standards of care for T3D patients, the acceptable guidelines for T2D may be applicable to T3D patients. Therefore, I explored practitioners' experiences with integrated care services in this study, including possible barriers such as the cost of treating patients with T2D and T3D. This study is essential because it may assist in initiating and establishing health care service recommendations of the appropriate services for T3D, and the results may further help practitioners recognize T3D as an actual syndrome, a chronic disease that needs more widespread adoption.

Background

Glycemic levels are a metabolic factor associated with insulin, a glucose regulator hormone (Nakrani et al., 2023). Insulin resistance is when the cells in the body stop regulating glucose, resulting in the need for hemoglobin A1C management, a factor of diabetes (CDC, 2019). Furthermore, glycemic levels and insulin resistance are also associated with an increased risk of cognitive decline, a precursor of Alzheimer’s (Koekkoek et al., 2015; Kong et al., 2018). Lee et al. (2018) found a possible “cause-effect” connection between blood sugar level and mental acuity. Some in the scientific and medical community make the case there is a link between diabetes and Alzheimer’s disease; however, not all of the medical community agrees, so the theory remains in question. Nguyen et al. (2020) reported the association between diabetes and Alzheimer’s, for which the mechanism of T3D is not precise; however, the authors noted the association is profound, such that they label Alzheimer's “diabetes of the brain” (p. 1). Koekkoek et al. (2015) stated that the proposed clinical term for people with diabetes who develop Alzheimer’s is T3D. Nguyen et al. indicated there is no cure for T3D, but some symptom-related treatments exist. Patients with T2D receive care, generally from the onset of diagnosis throughout the person’s life span (Marilla & Tollamadugu, 2018).

Whereas diabetes centers specialize in delivering diabetes care and typically, the physician’s office or another specialty cares for the Alzheimer’s patient, each health service organization (HSO) treats the respective disorders independently. Thus, a diabetes center's dilemma may be identifying the appropriate and efficient health care service for treating T3D patients, and scientists are currently exploring the biological aspects of the disease. For example, Papazafiropoulou et al. (2020) suggested antidiabetic agents may be beneficial for treating cognitive decline; however, further studies must be completed to understand the underlying causes. Additionally, Chen et al. (2017) and Nguyen et al. (2020) argued that a care plan is required to treat patients with T3D.

Because T3D is a relatively new indication, there is no official documentation on incidence or prevalence rates; however, scientists have determined T2D is a risk factor; therefore, they are using the rates of T2D to determine the chances of a person progressing to T3D. Chatterjee et al. (2016) reported that a person with T2D has a 60% chance of developing cognitive impairment. T3D is not officially accepted, and there is no concrete consideration for T3D care; consequently, the best road to establishing care may be to examine the current models physicians use to treat their T2D patients. Physicians can treat the symptoms of T3D using these models, thereby alleviating the risk. Sourcing the current care models will also help determine the amenities and referrals and establish a foundational cost for services appropriate for T3D care. Furthermore, identifying and querying physicians who already work with T3D patients may help identify barriers early in the process of developing a standard of care. Finally, since there is no T3D guidance, the current study may help begin a dialogue on the necessity for recognizing T3D as an official disease.

Problem Statement

The world’s population is aging, and as people age, the rates of Alzheimer’s and diabetes, two chronic ailments seen in aging populations, are exponentially increasing. Diabetes and Alzheimer’s are the sixth and seventh leading causes of death (CDC, 2019). As noted previously, providers are treating the symptoms of diabetes and Alzheimer’s separately. Recent evidence suggests there is a link between insulin resistance, an indicator of diabetes, and Alzheimer’s disease, creating a condition known as T3D (Huang et al., 2017). However, T3D diagnosis and treatment lack widespread adoption and awareness within the medical community. Diabetes care involves integrated care amongst several specialties, which is the case for the diverse comorbidities associated with the familiar form of T2D. Unlike T2D, clinical providers may not be aware of supplementary services or integrating specific services that should be considered in a health plan for the care of T3D patients. The medical system is already overwhelmed by diabetes as well, so T3D care only adds to the problem for an already burdened system. In addition, the extent of the disease may be more encompassing than currently thought because a more comprehensive integrated care plan is needed to delay neurocognitive processes, such as those that occur in Alzheimer’s disease. There may also be unique barriers and challenges to providing these additional health services, which must be incorporated into the best practices for diabetes diagnosis and treatment plans.

Overall, the research problem was that T3D is a neglected phenomenon, and there appears to be little documented knowledge of how physicians care for patients with the disease. Exploring the lived experiences of health care providers who have treated T2D and T3D patients may highlight potential barriers to the appropriate care and differences in health services needed to care for T3D patients effectively.

Purpose of the Study

T3D is a little-known medical phenomenon with which few medical providers are familiar. In this qualitative study, I explored medical providers' experiences with the health care services needed to treat T3D patients by reviewing the current care of T2D. Alzheimer's and diabetes are diseases that are found in aging populations; the unfamiliarity of T3D can lead to nontreatment or inappropriate care of this medical abnormality, which can be responsive to the aging society where this ailment will thrive, increasing the burden on an already taxed health care system. Furthermore, being familiar with the T2D services, a predeterminate of T3D, may prove fruitful in helping the medical community understand and establish the health care services that will be beneficial in the prevention and treatment of T3D patients.

Research Questions

What are medical providers' experiences with the health care services needed to treat patients with T3D compared to T2D? RQ2: What is the clinician's perception of the costs of T2D care compared to T3D?

Theoretical Foundation

The science of medicine is based on scientific theory (and deduction) and evidence-based practice. Physicians and medical providers care for their patients using established standards, such as the chronic care model, a guideline used by physicians providing care for patients with medical conditions such as diabetes.

The conceptual framework for the current study included Bandura’s social cognitive theory (SCT). In a nursing study, Manjarres-Posada et al. (2020) posited that Bandura’s theory, founded in 1997, provides the appropriate framework for health care comprehension and services. In the current study, I applied SCT to help analyze the collected data to help build knowledge of diabetes care for the health care system. Creswell and Creswell (2018) related the use of the approach to the “if-then statement,” and I used the theory to help describe how the providers’ T2D experience can impact the care for T3D patients. For example, if the clinician is unaware of T3D, they may not provide the measures to prevent T2D from progressing. Bandura’s theory can also measure knowledge and self-efficacy or obstacles to offering the appropriate care.

I also used the theory of relational coordination (TRC) as part of the conceptional framework. The TRC involves communication and collaboration, an act pertinent for the multiple professional colleagues and associates who could be involved in coordinating T2D and T3D patient care. According to the relational coordination theory (RCC, 2021), founded by Jody Hoffer Gittell, relational coordination is a way to break up industry silos, such as those found in treating patients for either diabetes or Alzheimer’s instead of treating T3D as one disease. The approach creates a path for the health industry to bring experts with the desired outcome together to help improve health care delivery.

Nature of the Study

I employed the grounded theory research design in this qualitative study to address the research question. According to Tie et al. (2019), the theory was founded by Barney Glaser and Anselm Strauss in 1965, and data was used to develop the theory through comparative analysis. Before collecting data, a small pilot study consisting of two subjects was conducted to gain insights into the interview process, the web-conference interface, the general feasibility of the study, and other related aspects to help design compelling research. I conducted semi structured, open-ended, virtual interviews using Zoom and the Quirkos web conferencing platform. Seven medical professionals who had experience treating T2D and T3D patients were interviewed. The interview data were transcribed, coded, categorized, and thematized.

Definitions

Alzheimer's: A chronic mental ailment that progressively worsens with age. It is a disease that may lead to cognitive decline, memory loss, or dementia. According to the AA (2021), Alzheimer’s is a mental anomaly, a form of dementia in which one’s quality of life is impacted by memory, behavior, and thinking processes.

Diabetes: A prolonged medical condition and chronic disease where a person’s pancreas is not functioning appropriately. The International Diabetes Federation (2021) defined diabetes as a chronic ailment that occurs when the pancreas does not produce adequate insulin or the body misuses the insulin.

Insulin: The body’s metabolic vehicle to transport food to the cells to produce energy. According to the ADA (2021), insulin is a hormone excreted by the body to help regulate the glycemic level used for energy.

T2D: A form of diabetes in which the body does not produce enough insulin. The ADA (2021) stated that T2D is when the body improperly uses insulin. Once known as adult-onset diabetes, physicians use a standard guideline to care for patients with this ailment.

T3D: A combined metabolic and neurological phenomenon that is not commonly recognized but occurs when people with diabetes exhibit cognitive decline, leading to Alzheimer’s. Leszek et al. (2017) referred to T3D as “brain diabetes.”

Assumptions

I made certain assumptions related to this study, including that I could find providers of T2D and T3D who would be willing to discuss their diabetes care plans. In addition, I assumed that the practitioners interviewed would be forthright and thorough with the information they provided. Another assumption was that the providers would have experience treating the different forms of diabetes in their patients and would distinguish a difference in their care of the different forms when compared. I also assumed that my connections with the diabetes community would lead to the ability to recruit the medical providers needed as participants for the research.

Scope and Delimitations

The general intent of this study was to determine what additional services and costs are needed to treat patients with T3D. This study was limited to all health care practitioners, including physician assistants, diabetes educators, clinical managers, physicians, and clinical nurses who serve patients with T2D or T3D. Other forms of diabetes, such as Type 1 or gestational diabetes, were not considered for the study. Providers who worked solely with Alzheimer's patients were also excluded from the study. All providers were asked to share their experiences caring for patients with T2D or T3D.

Limitations

A potential barrier to this study was identifying providers who had treated patients diagnosed with T3D. In addition, the provider response may have been an obstacle because the providers may not want to appear undedicated, unknowledgeable, or biased. Other potential obstacles included obtaining the necessary approvals from the prospective partner agencies for the primary information collection and establishing a data use agreement. Furthermore, there were barriers with the selected HSOs because they required approvals from their respective institutional review boards (IRBs) in addition to their organization's other processes or standard operational procedures and perceived conflicts of interest, which imposed time constraints. There was also a challenge ensuring that I, employed professionally as a metabolic researcher and have multiple connections to diabetes professionals and lay communities, remained unbiased while conducting the study.

Significance

This study is significant because the findings are meaningful to health care service providers. The evidence-based data revealed how clinicians who do not provide specific elements of care may not provide adequate health care services to their T3D patients. The study findings may also help inform the health care field of the barriers and challenges for delivering T3D care, without which patients do not receive the necessary ancillary services to help decrease disease burden or potentially reduce health care costs. Moreover, providers can use the study findings to help reduce patient risk of exacerbating T2D by increasing their awareness and improving overall diabetes care while improving health outcomes for people with T3D. Overall, the findings may help reduce the financial burden of diabetes care on the health care system.

Summary

Currently, providers’ care for T3D is not standardized because T3D is a metabolic manifestation that the medical community has not openly recognized. Notably, there may be some confusion regarding the inception of the disorder. In the current study, I explored the treatment modalities to help alleviate questions about T3D care. In addition, knowledge and information on referrals, integrated services, and the cost of care identified by providers can help ease an already burdened health system. Finally, comparing the existing care of T2D and T3D will pave the way to help researchers and providers realize the type of health care services needed for patients with T3D. In Chapter 2, I will present the extant literature comparing providers’ services used to treat T2D and T3D patients.

Chapter 2: Literature Review

People with diabetes require care outside the primary practice, so coordination and care integration are vital. Therefore, a multidisciplinary committee of practitioners gathers to develop diabetes standards for health care services, such as the Professional Practice Committee comprised of practitioners in endocrinology, cardiovascular, nutrition, obstetrics, education, and other health care areas (ADA, 2021). In this general qualitative study, I explored medical providers' experiences of some health care services used to treat patients with T2D. The study served as a template for treating patients with a less-known version of diabetes, T3D. Overall, the research problem was that T3D is a neglected medical anomaly, and there appears to be little documented knowledge of the health services that medical providers use to care for patients with the disease. Therefore, exploring the lived experiences of health care clinicians who treat T2D patients may be meaningful in identifying potential barriers to the treatment of T3D. Sharifi (2017) found that diabetes knowledge is essential for diabetes management, implying that providers' knowledge of diabetes guidelines and services can benefit patients' outcomes and impact the health care they receive.

Furthermore, the findings showed how costs are associated with providing adequate health services for T3D patients. Exploring T2D care may help practitioners understand how care costs may become a problem when there is no early diagnosis, whereby overall diabetes services may become more complicated. Additionally, the study helped expose unexpected obstacles related to access to care or coordination of care.

Overall, the study was beneficial because it helped establish health care service delivery for an increasing population of T3D patients.

Understanding the current applications of T2D may help physicians establish treatment plans for patients with T3D, an unrecognized manifestation of diabetes where people with a T2D diagnosis incorporate mental decline or Alzheimer’s into the disease spectrum. The barriers and costs to understanding health services are potentially unexplored; however, the incidence of T3D is rising. Therefore, it would benefit clinicians to know what health services can be provided to their patients with T3D.

I conducted this study not to teach providers how to care for their patients but to increase their awareness of potential problems surrounding the treatment and care of T3D patients. Moreover, the findings will not only help providers establish T3D health services, but the data generated also has the potential to help update the current standards of care by including information on T3D.

I combined the SCT and TRC to act as the conceptional framework for this study. This framework helped me explore clinicians’ experiences of providing health care services for both T2D and T3D patients. I have structured the literature review into the following sections: (a) theoretical framework, (b) diabetes, (c) T2D, (d) Alzheimer’s, (e) T3D, (f) cost, and (g) a summary.

Strategy for the Literature Search

The sources used for this study included research from other dissertations and peer-reviewed articles that were published between 2016 and 2021 on websites and in online reports, scientific publications, and scientific conference materials. I searched the following databases accessible through the Walden University Library: PubMed, Medline, Elsevier, ProQuest Health and Medical Conditions, and EBSCO. The following keyword search terms were used: *Type 3 diabetes, diabetes, Type 2 diabetes, Alzheimer's, cognitive decline, diabetes care, diabetes management, provider awareness, provider perceptions, clinical inertia, the cost of diabetes, diabetes services,* and *health services*. For example, searching for *Type 3 diabetes, health care services, costs,* and *barriers* in the ProQuest Health and Medical Collections database generated 11 articles, but none were relevant to this T3D study. Searching just the term *Type 3 diabetes* in BioMed Central yielded 59,792 results; however, narrowing the search by adding the terms: *health services, integration of care, referrals, barriers, cost, type 2 diabetes, provider knowledge, clinical inertia,* and *qualitative*, produced 20 articles. I conducted additional searches on websites, including the International Diabetes Federation and the *Journal of the American Medical Association*. Abstracts were also searched in the ADA Scientific Sessions, Google Scholar, and the AA website.

Theoretical Foundation/Conceptual Framework

The TRC

The TRC is used to explore how integrating services is pertinent to good clinical outcomes (Thygeson et al. 2021). The concept involves communication amongst teams with a common goal in mind (e.g., in this study, good clinical care for patients with diabetes). For example, a practitioner could connect the patient to the appropriate care, such as an eye care specialist, a wound specialist, a neurologist, or other providers focusing on diabetes care. Furthermore, the physician may address barriers prohibiting a patient from receiving care. Thygeson et al. (2021) supported the TRC and found that it promotes good communication and coordination of health care. Thygeson et al. (2021) reported that the TRC is a nominal interpersonal communication tool because it serves as a conduit for good patient outcomes. Thygeson et al. continued to say that there is a correlation between the TRC and "safety, cost, patient experience, staff satisfaction, and well-being, and the capacity to innovate; TRC focuses on improving communication, relationships, alignment, and systems awareness to foster more effective collaboration on interdependent tasks, ultimately resulting in performance improvement" (p. 1).

SCT

Albert Bandura proposed the SCT in 1960, and after 20 years, the theory evolved to the current form of SCT (Creswell & Creswell, 2018). In the current study, I used the SCT to reveal how self-efficacy can influence the potential health care services clinicians will offer for treating T3D. Sibounheuang et al. (2019) conducted a systematic review using SCT to providers' perspectives of the factors influencing diabetes care. They concluded that clinical inertia was a factor, and this was a product of clinician uncertainty secondary to continuous changes in the treatment guidelines. In addition, the authors discovered health care providers perceived they lacked knowledge of the diabetes guidelines and skills necessary to assist their diabetes patients. Thus, using SCT can be instrumental in measuring a clinician's self-efficacy. Like Sibounheuang et al., Jones et al. (2016) reported that clinicians claimed they needed further education when it came to diabetes care, specifically in communication skills. Jones et al. conducted a systematic review of how dynamics and communication influence how well patients manage their diabetes. The communication strategies providers used when educating patients on diabetes, including management, could influence diabetes care and how well the provider communicates with the patients could depend on how knowledgeable and comfortable the provider feels about delivering what they know about diabetes care. The overall study findings indicated that mentally, clinicians lacked self-assurance and fell short when communicating with their patients about diabetes care; both are necessary skills for good health care delivery.

Literature Review Related to Key Variables and/or Concepts

Diabetes

Diabetes is an umbrella term for a metabolic disorder in which a person experiences a physiological anomaly related to how the body regulates insulin. When an individual consumes food, it is distributed throughout the body, and some food products convert into glucose that travels in the blood. The influx of glucose causes the pancreas to release insulin, which fuels the body, creating energy. If the body responds to insulin negatively by creating too much or not enough, the person becomes someone with diabetes. The way the body responds to insulin will determine the diabetes diagnosis. A physician will generally test for diabetes with a hemoglobin A1C test or another glucose testing procedure. The American Medical Association (2021) noted that clinical providers use a framework known as the M.A.P. (i.e., M = measure accurately; A = act rapidly; and P = partner with patients, family, and communities) to diagnose and treat their patients. There are three common types of diabetes that endocrinologists or other practitioners work with their patients to manage: Type 1, T2D, and gestational diabetes. About 10% of people with diabetes have gestational or Type 1 diabetes, which is not as familiar as T2D (CDC, 2021).

Insulin resistance is a cause for some pregnant women to develop gestational diabetes. The CDC (2021) found that approximately 10% of pregnant women develop gestational diabetes annually. A manifestation that occurs during the second or third trimester of pregnancy, gestational diabetes often goes away after the woman gives birth; however, almost 50% of the mothers who develop gestational diabetes are at a higher risk of developing T2D later in life (CDC, 2021). Quintanilla (2021) described two classifications of gestational diabetes, A1GDM and A2GDM, whereby A1GDM is mainly controlled without medication, and A2GDM is controlled with medications. Some studies have purported that children born to women with gestational diabetes are also at increased risk for developing diabetes (ADA, 2021; CDC, 2021). The OBGYN provider generally manages health care services for pregnant women with gestational diabetes; however, Quintanilla indicated the clinician will often consult an endocrinologist and that good health outcomes require interprofessional collaboration among different disciplines, including nurses, physicians, and pharmacists.

Type 1 diabetes is when the pancreas makes inadequate insulin, which causes too much blood sugar to collect in the bloodstream (CDC, 2021). Type 1 diabetes was once termed juvenile-onset diabetes: however, researchers have since discovered the onset can occur at any age, so the term juvenile diabetes is no longer used by the medical community, scientists, or medical providers (Juvenile Diabetes Research Foundation, n.d.).

Because diabetes affects specific organ systems and parts of the body, health services vary, with some referrals for services coinciding with the type of diabetes the person has. For instance, people with gestational diabetes may need guidance for managing diabetes during their pregnancy, which may consist of nutritional counseling or working with a birth coach. The goal for gestational women is to keep the expectant mother and her baby safe, so health professionals will be mindful of the mother’s health, the baby, and diabetes by prescribing the appropriate referrals. In addition, regardless of the type of diabetes a patient has, food intake is an integral factor; therefore, clinicians may refer patients with diabetes to nutritional counseling. Grégoire and Philis (2017) stressed how vital nutrition management is for glucose control and good health outcomes for diabetes patients.

Additionally, practitioners who treat patients with diabetes should also provide psychological care because this disease impacts the patient's mental capacity along with the physiological aspects, including the quality of life; therefore, familiarity with the diabetes type and some mitigation strategies is pertinent for good patient outcomes.

T2D

More than 90% of people with diabetes have T2D (CDC, 2021). T2D happens when the body mismanages its insulin, and too much insulin may increase the blood glucose. T2D requires the clinician to refer their patients to health care services within and outside the primary practice, which may depend on specialty. Additionally, referrals are necessary to prevent T2D from progressing to other disease states, such as cardiovascular disease or cognitive impairment. Because glucose level is a major limiting factor for T2D and diet and physical fitness need addressing in patients with T2D, providers may refer patients to a dietitian or nutritionist (International Diabetes Federation, 2021). A comprehensive range of health services may be appropriate for T2D care, including preventative, curative, palliative, and rehabilitative services. Referrals may also be made for podiatry, ophthalmology, or even psychosocial services. The health care services may be implemented in an integrated manner to coordinate services. Wenzel and Simmons (2017) explained how integrated services are relevant to health services, stating that the collaborative effort of the professional partnership is a “horizontal integration” in which care is in the clinical space. They proposed clinical partnerships involve “the articulation between primary and secondary care and the associated governance” (p. 1).

Diabetes health care services may involve referral to integrated services and sometimes diabetes management education. Diabetes self-management courses may be in group settings, whereby facilitation is led by health educators, behavioral health persons, certified diabetes educators, or trained laypersons (Powers et. al., 2016). The layperson could be a community health worker or a promotora. The primary care doctor, physician’s assistant, or nurse practitioner who initially conduct the examination may prescribe alternative services, such as meeting with a licensed social worker, endocrinologist, or other diabetes managers (ADA, 2021). In addition, the CDC (2021) has evidence-based programs, such as the Diabetes Self-Management Education program, to which providers are encouraged to refer their patients with diabetes. These workshops are led by trained and certified diabetes coaches who teach those with diabetes how to manage the disorder.

Alzheimer’s

For some patients, if left unchecked, T2D may lead to other medical impediments, such as Alzheimer’s, which is a form of cognitive impairment or mental decline. According to the World Health Organization (WHO, 2021), Alzheimer’s is the most common form of dementia that can manifest symptoms of memory loss, unclear thinking, and disruptive reasoning skills. The WHO indicated that dementia is preventable with a public health intervention. A diagnosis of Alzheimer’s is determined through brain imaging, blood tests, mental skills assessments, and evaluation for neurological deficits (AA, 2021).

The rate of Alzheimer's is increasing, and researchers have reported a connection between hemoglobin blood glucose levels (a diabetes factor) and cognitive impairment (Marden et al., 2017). In addition, the WHO (2021) stated that diabetes is a medical condition that increases the risk of developing dementia. Like diabetes, the brain of a person with Alzheimer’s has a pathological defect of insulin resistance, producing Aβ plaques and neurofibrillary tangles (Candasamy et al., 2020). Alzheimer’s is also similar to diabetes in other metabolic characteristics, such as oxidative stress and inflammation (Candasamy et al., 2020). Conversely, Lo et al. (2018) found no association between mental deficiency and glucose levels in patients with diabetes who received ongoing mitigation.

Alzheimer’s is already a growing concern for the medical community because it is a disease that impacts aging, and the world has a population of individuals who are aging at an exponential rate (United Nation, 2019). In addition, researchers are also finding people diagnosed with other ailments, such as diabetes, experience mental decline as they age.

The quality of life for an individual with Alzheimer's may be significantly impacted; the care warranted for those suffering from mental impairment may be extensive. Therefore, provider referrals may include suggestions for home care, short and extended-care services, legal support, and other not necessarily medically related areas.

Akimoto et al. (2020) further indicated Alzheimer’s generally occurs after a diagnosis of diabetes, yet the medical community is not familiar with this. People with T2D who progressively experience cognitive impediments that potentially lead to Alzheimer's should be recognized as having T3D; this newest form of diabetes is not commonly accepted.

T3D

T3D is not a well-known disease; it is a progressive ailment seen in people diagnosed with T2D. According to research, T2D and Alzheimer's have similar molecular and biochemical traits; therefore, scientists stress people with T2D should control their glucose and insulin levels; otherwise, it will lead to a mental decline or cognitive impairment, T3D. Notably, in a study conducted by Dove et al. (2021), the data indicated a correlation between glycemic levels and cognition in some instances. For example, for study participants with uncontrolled glucose levels, there was double the risk for cognitive impairment no dementia, whereas, statistically, the hazard ratio was 2.01, with a 95% confidence interval. On the other hand, the Dove et al. study showed how an uncontrolled glycemic level triples the risk of developing dementia for those with cognitive impairment; the hazard ratio was 2.87 with a confidence interval of 95%.

The pathophysiological implications of the disease are not well understood, and there is not a lot of research on health care services. Marden et al. (2017) argued there is not enough information on how insulin function is related to memory deficits; however, they do stress understanding the mechanism of action is warranted for clinical practice and patient outcomes. The published research points out there is an anomaly in that people with a diabetes diagnosis tend to develop cognitive decline as they age. Also, research reveals the overall cost of diabetes, which would include T3D, can be an economic burden to patients, their families, and the health system (Riddle & Herman, 2018).

Health Services

Diabetes impacts multiple organs and body systems; therefore, it is necessary to involve a variety of specialists or professionals in diabetes care. Moreover, managing the disorder means the diagnostician will likely expect the collaboration of multiple health systems to refer their patients as part of a management team. The ADA (2021c) found diabetes health care teams should consist of;

- Nurse practitioners or physician assistants
- Registered dietitians/ nutritionist
- Pharmacist
- Mental Health professional

- Eye doctor
- Foot doctor

Below are examples of some of the health services diabetologists and other medical providers seek for their patients with diabetes.

- Ophthalmology: The ADA found eye care for a person with diabetes is necessary as vascular complications are highly favorable for people with both type 1 and T2D, and the probability increases as the disease progresses (American Diabetes Association, 2021b). According to Solomon et al. (2017), diabetic retinopathy is the cause of most blindness in adults 20-74. Therefore, the sooner eye care is initiated, the better the chances of decreasing the risks of vision loss.
- Podiatry: The ADA (2021b) says an annual foot exam is essential to prevent ulceration and other complications, including amputation. Foot care is vital for diabetes health services; the lack of attention to the lower extremities can lead to peripheral artery disease and amputation. Fakorede (2018) found that 230 people in the United States with diabetes had a foot or leg amputated, and globally, 85% of amputations are diabetes related. Some of the symptoms a person with diabetes may experience are leg pain, slow-healing open sores, cracked heel skin, and foot swelling. Notably, below-knee amputation is more common in racial groups and Medicare populations (Barnes et al., 2020).

Further, another concern with diabetes patients with Peripheral Artery Disease is that it impacts the healthcare system annually at an estimated cost from $84 billion to $380 billion. Therefore, podiatry health services should consider foot care evaluations, costs, and management.

- Neurology: Peripheral neuropathy is a common debilitating factor that affects the quality of life of diabetes patients. Neurology services will work with the patient to find a therapeutic source to help relieve pain. The health services involve discovering the appropriate pharmacological products or working with pain management specialists to help the patient find pain relief.
- Nutrition: Dietetic services are essential for diabetes as blood sugar regulation drives the disease. The ingestion of food and how it is processed in the cells is optimal for diabetes control. Therefore, working with a dietician as part of care management is one of the main areas of health services for a person with diabetes.

Cost

Ong et al. (2018) documented two main factors influencing diabetes management and care: the cost imposed on patients and access to health services and medication. The ADA (2018) found that between 2012 and 2017, diabetes has increased by over 25%, and diabetes poses a financial burden on the health care system. Not only is the cost of health care a significant factor for all therapeutic indications, but when two major diseases morph into a single disorder, such as T3D, one can expect the cost of care to be exponentially high. Tomlin and Sinclair (2016) observed diabetes, cognitive decline, and the resources involved in health care costs influenced the financial requirements needed for maintenance and management. As noted thus far, diabetes care will require ancillary services, referrals, and care coordination to maintain the disorder. For instance, Gračner (2020) indicated screening for diabetes eye disease is imperative as it is a cost-saving preventative for vision loss. According to a study by Thomas et al. (2020), it cost the National Health System in the United Kingdom $65 million in 2011, and they expect it to be more than $110 million by 2035.

Diabetes self-education programs are evidence-based management programs for which clinicians refer their patients or implement in their organizations; unfortunately, many insurance providers do not cover the services, and can become financially burdensome to practitioners. To address this, the American Medical Association has created a tool kit containing several resources that providers can use for diabetes prevention and patient education strategies; one of the tools is a cost calculator for practitioners to use, which estimates the cost of implementing a Diabetes Prevention Program in their clinics as a covered benefit. Tan et al. (2021) reported in the United Kingdom, the management of diabetes is becoming more complicated as the number of people with diabetes continues to increase. To address the cost of care, Tan et al. (2021) said they are exploring ways to implement a tariff system to regulate diabetes care; the tariff is to “identify, quantify and transfer money between commissioners and secondary care providers” (p. 3).

Summary and Conclusion

Chapter 2, I examined health services and care for the different types of diabetes. I also discussed Alzheimer's and how clinicians recommended care for patients with this mental disorder. Research by Kima (2020) showed how mitigation strategies such as physician care and referral can help control diabetes and Alzheimer’s costs and patient outcomes. There is plenty of diabetes research, yet very little on T3D as it is not entirely accepted by the medical community.

In conclusion, a good course of action for T3D health services may be for practitioners to amplify the familiar health services involved in the current care for T2D while considering the cost of care and the need for referral networks and integration of services. Furthermore, providers can subsequently apply those same services in the health care regime of their T3D patients. Altogether, these efforts may prove necessary and beneficial for recognizing barriers to appropriate care, thereby creating good health care services, patient care, and positive outcomes for patients with T3D.

Chapter 3: Research Method

In Chapter 3, I described the qualitative research design used in this study to examine clinicians’ experiences with providing health care services to treat T3D patients compared to T2D patients. The subsequent major sections of this chapter include the study approach, the research questions, the researcher’s role, and the methodology. In Chapter 3, I also provide a synopsis of the data collection and analysis tools as well as discuss assurance of the study’s validity, ethical procedures, and participant recruitment and selection.

Research Design and Rationale

Qualitative research can be used when a phenomenon lacks theory, such as in the case of the T3D anomaly. In this study, I conducted a general qualitative interview-based inquiry to analyze clinical associates’ experiences of providing health care services to patients with diabetes. In this study, the grounded theory, one of three qualitative designs, was used to gather the data from the participants’ perspectives. The participants’ interview responses used to address the research question of: What are medical providers’ experiences with the health care services needed to treat patients with T3D compared to T2D? I also questioned the participants regarding their general perceptions of the barriers to T2D care.

Role of the Researcher

I held no direct supervisory or subordinate relationship with the study participants. I also had no conflicts of interest, fiduciary remuneration, or incentives for conducting this research. In addition, my role in this study was strictly as the study investigator. I created the questionnaires and administered them appropriately to the research participants. Furthermore, I worked to ensure confidentiality and followed guidelines established by Walden University and the partnering organizations. As the researcher, I collected, analyzed, and reported the findings.

The study's potential barriers included obtaining approvals from partner agencies and establishing a data use agreement. Furthermore, I suspected that there may be barriers with the selected HSOs because they may have required obtaining approvals from a specific IRB or had standard operations processes or procedures that could have, in turn, imposed time constraints.

Another challenge could have been ensuring that I, who am employed professionally as a metabolic researcher with multiple connections to diabetes professionals and lay communities, remained unbiased while conducting the study. To avoid potential bias, I excluded clinicians with whom I serve on the local Diabetes Leadership Council. Furthermore, I had measures in place to stay impartial during the study, such as working with an independent party to analyze the interview questions to ensure that they were not steering the subjects into providing a particular response. Following Moser and Korstjens's (2018) suggestion, I limited my explanation of the study to not influencing the provider's point of view and encouraged the participants to express their responses without apprehension. Lastly, I employed reflexivity strategies. Koopman et al. (2020) explained reflexivity as a tool that a researcher can use as a form of self-assessment while developing the study and throughout the research process. Reflexivity is also a means for ensuring rigor.

Methodology

According to Adeoye-Olatunde and Olenik (2021), a general qualitative interview-based inquiry is helpful when a researcher wants to gain an understanding of a participant's perspective on a phenomenon. For this reason, I used an interview-based line of questioning to evaluate practitioners' experiences with diabetes care in the current study. The interviews were electronically administered in accordance with established guidelines and privacy protocols. Due to the COVID-19 pandemic, I attempted to limit face-to-face contact with the research participants; however, as the CDC recommended, I took all precautions and accommodated the subjects with an in-person interview when requested.

I gathered primary data to collect firsthand information and experiential knowledge from the participants in the study. Primary data are preferential because limited information on T3D has been published, and there is little or unsubstantiated data on the health care services used to treat T3D.

Participant Selection

Using a purposeful sampling strategy, I recruited participants via word of mouth and electronic communication, such as email, or on professional sites, like the ADA or the Alzheimer's Membership Forum. Semi structured, open-ended interviews were conducted with medical professionals consisting of physicians, clinicians, and other care providers at Alzheimer's or diabetes centers, endocrinology, and private practice offices who worked with T2D and T3D patients. Initial recruitment included flyers and emails to clinical practices. When a medical professional expressed interest in participating in the study, I provided them with the Informed Consent form before scheduling a meeting with them. At the planned electronic appointments, the informed consent form was discussed with the participants and their verbal confirmation was obtained. After obtaining their informed consent, the survey part of the study began, for which I explained the study instrument to each participant and, within an allotted time period, asked the participant to complete the questions. Notably, all collected data were kept confidential and secured.

Instrumentation

I developed a research guide detailing the steps of the study and listing items, such as the research introduction to the participant and explanation of the study's purpose. I also created an instrument containing the data points where I collected the direct interview responses from the clinicians along with documentation of their experience in providing medical services to patients with diabetes. The instrument development was based on a pilot study and the results of the literature review.

Pilot Study

Before the primary study implementation, I conducted a small pilot study consisting of two subjects (who were friends) to gain insights into the interview process, the web-conference interface, the general feasibility of the study, and other related aspects to help design a compelling study. The information collected from the pilot study was not considered or included in the main study.

Data Collection

After participant recruitment and once informed consent was signed, I worked with the research participants to establish dedicated times for the interviews. All the participants chose a specific day and time. The appointments allowed me to collect data through virtual, audio and video recorded interviews using Zoom, the web-based platform of Quirkos, and the telephone. The data were recorded and transcribed utilizing Microsoft Office Live and another transcription service, Quirkos. After the interviews, I de-briefed the participants, thanked them for their contribution, and asked if I could contact them if further information was needed. I also asked if they would like a finalized copy of the study after it is published.

Saturation and Sample Size

Saturation was met after the data collection no longer produced new information, and redundancy or repetitiveness in responses to the data was observed. For example, when the participants in the study followed the diabetes standards of care, a pattern evolved, and data became repetitious; thus, saturation occurred because no new substantive data were acquired. As with any qualitative research, only a small sample was needed for data collection; therefore, there were seven participants in this study.

Interview Questions

- What service do you provide for your T2D patients?
- Are you familiar with T3D?
- Have you treated patients with T3D?
- What services do you provide for your T3D patients?
- Do you feel confident treating patients with T3D?
- When caring for your diabetes patients, what barriers have you encountered?
- Are you experiencing barriers with insurance companies? For example, do they cover the cost of care?
- What is your general perception of the cost of care for T2D compared to T3D?

Data Analysis Plan

I transcribed, coded, categorized, and thematized the interview data. A qualitative data analysis software program, Quirkos, was utilized to assist in the analysis.

Issues of Trustworthiness

Trustworthiness is a vital aspect of research; therefore, I made every effort to ensure that the data and all aspects of the study were traceable and maintained. In the following subsections, I discuss the areas of trustworthiness specifically.

Validity

I created and piloted an instrument for content validity (with colleagues) to determine how long it would take to complete the questionnaire and gauge the appropriate fit of the study participants. The validity of the instrument was also tested by locating an instrument with similar questions that had already been used and proven reliable. In addition, I continued to review the literature and consulted an outside expert for feedback. Finally, use of additional strategies, such as member checking, allowed me to present the findings to the original participants to confirm their perceptions were accurately captured.

Credibility and Transferability

When thinking about confidence and truthfulness, I cross-checked the data to ensure they could be transferred to another party or persons. In addition, I provided a detailed description of the study in the narrative so that another researcher can replicate my research.

Dependability and Confirmability

I read the transcripts several times to ensure I clearly understood the data. Two other people also read the documents such as the consent and Interview questions to ensure the information was accurate. Then, I also had other people review the transcripts to ensure the data were not biased.

Ethical Procedures

I obtained approval from the Walden University IRB before the study began. The participants signed an informed consent upon acceptance and before any data were collected. Data were de-identified, and confidentiality was maintained throughout the study and after completion. All information, including study data, will be secured and retained as specified by the IRB or other regulatory agencies.

Summary

In Chapter 3, I described the general qualitative interview-based inquiry research method used to examine medical providers' experiences with providing health care services to treat T3D patients compared to T2D patients. The chapter includes a discussion of the methodology, including the participant recruitment strategies, data collection and analysis processes, and survey instruments used. Chapter 4 will provide the overall data analysis and the results from the data collection.

Chapter 4: Results

In this qualitative study, I explored medical providers' experiences with the health care services needed to treat T3D patients. Specifically, the purpose of this study was to review the participants' current care of T2D when compared to T3D. In Chapter 4, I discuss the study setting, data collection and analysis processes, and study findings. The study was guided by the following research questions:

> Research Question 1: What are medical providers' experiences with services required to treat T3D patients compared to T2D patients?
>
> Research Question 2: What is the clinician's perception of the costs of T2D care compared to T3D?

I conducted a small pilot study that included two colleagues. The pilot participants were sent a test email with pseudo-study information and my contact information. Once I received their email response, I responded by sending them a blank Microsoft Word document (representing the consent form), after which I sent a Zoom meeting invite. The colleague then called into the meeting, and I tested the volume. I also tested to make sure I could audio record on both the Zoom platform and a handheld device. The information collected from the pilot study was not considered or included in the main study.

Settings

This study was granted approval by the Walden University IRB (Approval Number 12-06-22-0985555). After obtaining approval, I sent an IRB-approved email to a diabetes program manager who shared the study information with their associates and colleagues who worked with diabetes patients. Furthermore, the approved email was sent to the director of a diabetes advocacy organization who also shared the email with other clinicians. Some prospective clinicians contacted me through word of mouth and the snowball method. I emailed these potential participants to verify their interest in the study.

After determining the participants met the study criteria, I assigned a predetermined day and time for participant interviews. The study participants, who were medical professionals consisting of physicians, clinicians, and other care providers at Alzheimer’s and diabetes centers, endocrinology, and private practice offices who worked with T2D and T3D, were queried through the use of semi-structured open-ended interviews over the Zoom platform.

After giving verbal consent to take part in the study, I interviewed the participants using the questions listed in Chapter 3. One interview was held in a private office at my place of employment, and the others were conducted virtually from my home when no one else was present, allowing for privacy. The study participants were not exposed to untoward influence during the interview process. I conducted seven participants interviews, and no further interviews were completed once saturation was confirmed.

Demographics

I recruited seven participants for this T3D research project. The participants had various roles (see Table 1): Participant 1 (P1) is a family practice physician; Participant 2 (P2) is a nurse practitioner who travels to her patients to provide in-home care; Participant 3 (P3) is a nurse who works from a private practice office; Participant 4 (P4) is a nurse practitioner who works in a private clinic that provides care to people in hard-to-reach communities and teaches nurses at a community college; Participant 5 (P5) is a medical doctor who practices and treats diabetes patients in Arizona and Mexico; Participant 6 (P6) is a dialysis nurse who treats patients with diabetes, other metabolic/cardiometabolic-related conditions, and in her words, "different stages of dementia;" and Participant 7 (P7) is a Ph.D. nurse practitioner and educator who has historically worked in Native communities.

TABLE 1

DEMOGRAPHIC INFORMATION

Participant	Position	Work setting	Credential	Gender/sex
Participant 1	Physician	Family practice	Doctor of Osteopathic Medicine	Male
Participant 2	Nurse	Traveling nurse	Nurse Practitioner	Female
Participant 3	Nurse	Private practice	Registered Nurse	Male
Participant 4	Nurse	Private practice	Nurse Practitioner	Female
Participant 5	Physician	Private practice	Doctor of Medicine	Male
Participant 6	Nurse	Dialysis nurse	Bachelor of Science in Nursing	Female
Participant 7	Nurse	Community nurse	Family Nurse Practitioner-Certified	Female

Data Collection

I collected data from seven clinical professionals, as described in Chapter 3. The study involved primary data collected from medical providers employed at medical practices in both the United States and Mexico. Before collecting any data, I asked the participants if they understood the study described in the informed consent form and if they had any questions, after which they were asked if they consented to participate in the study. Except for the first interview, which was held in a private office, the other six interviews were held virtually over the Zoom platform from the privacy of my home. The interviews took approximately 20–30 minutes and were audio recorded on both a digital hand-held device and the Zoom platform. I also took handwritten notes for documentation purposes. Upon concluding the interview questions, I summarized the questions and the participants' responses so the participants could confirm their responses. All audio recordings were transcribed and then analyzed for credibility. I also asked the participants if they would be interested in receiving a copy of the study after it was completed, and all said they would be. No unusual circumstances or variations from the original data plan as presented in Chapter 3 were encountered during the data collection.

Data Analysis

In this T3D study, I examined clinicians' experiences treating patients with T2D and T3D. Upon completion of the data collection, I transcribed the Zoom audio recordings of each interview. I reviewed my notes and compared them to the recordings multiple times to ensure accuracy. Transcription was done using Microsoft Word and the Zoom platform, and the transcribed data were additionally uploaded to Quirkos.

Using a Microsoft Excel graph and manual coding, I divided the Excel document into units, codes, categories, and themes. With the application of inductive reasoning, some of the categories that emerged from the codes were patient education, disease management, family care, coordination of care, and cost. From the codes and categories, the following themes emerged:

Theme 1: Providers are not specifically treating T3D.

Theme 2: Most of the providers were not familiar with T3D.

Theme 3: Most participants have unknowingly treated their patients for T3D.

Theme 4: Diabetes care involves wraparound services/care coordination.

Theme 5: Family and caregiver support is essential.

Theme 6: Providers are confident but hesitant when dealing with cognitive issues.

Theme 7: Resistance, insurance coverage is an issue.

Theme 8: Patient noncompliance/resistance, nonacceptance.

Theme 9: The cost of care for T3D will double.

Evidence of Trustworthiness

Credibility

As noted in Chapter 3, credibility is a crucial aspect of research because it leads to the validity and accuracy of the collected data. For this study, I cross-checked the data to ensure another researcher could replicate the research. In addition, I engaged a colleague who was not involved in my study for peer support. We had continuous communication throughout the study from inception to the data analysis and reporting of the findings. This peer's role was also beneficial in preventing research bias. To ensure accuracy in the participants’ interview responses, I summarized the answers, sent this information to the participants, and allowed them to provide feedback.

Transferability

Transferability is the ability to replicate the study, and Makel et al. (2022) noted, “When qualitative researchers provide enough information about the sample, data collection, and data analysis processes, readers can then critically evaluate whether the findings might be applicable to similar contexts” (p. 2). I established transferability by clearly describing the research process, including the methods and procedures employed for data collection and analysis. Another researcher should be able to apply the information in this study or transfer it to another research project.

Dependability

Dependability was demonstrated with the use of audio recording and other methods of data collection. I exhibited triangulation through using multiple modes to collect data for analysis, which also helped establish dependability. During the interviews, I recorded Zoom videos, audio recorded the interviews, and wrote out the participants’ responses. I also verified my documentation by transcribing the recordings.

Confirmability

Confirmation was a valid component of the study. I asked a peer to review the data to confirm the validity of the interviews’ transcriptions.

Results

A total of seven clinicians participated in the study, and all stated they provided care to patients with diabetes. Two were doctors, a doctor of osteopathic medicine and a doctor of medicine, and the other five were nurses holding various degrees from bachelor to family nurse practitioner (see Table 1).

I conducted the study interviews based on the clinicians’ availability. After each interview, the audio recording was transcribed and saved to a password-protected computer. I assigned each participant a participant number when saving their data to maintain confidentiality. The interview questions were aligned with the research questions. After interviewing P4, I noticed the responses were redundant, but I continued interviewing additional participants to verify the redundancy. No new information was produced after this point, signaling that saturation was reached.

Responses to Interview Questions

Interview Question 1: What Type of Clinical Care do You Provide to Your T2D Patients?

Theme 1 was identified with this interview question and was primarily focused on management and education. Providers are not explicitly treating their patients for T3D; however, they offer the same standard of care for their T2D patients. The participants in this study appeared to provide some form of diabetes management and patient or caregiver education. All the participants, P1–P6, indicated that they provided preventative or tertiary diabetes management and education to their patients and their families. For example, a participant said they provide care primarily based on education and that they determine the best treatment for their patient’s condition and discuss dietary changes, exercise, and medications with them. P2 indicated that they “focus on primary care centered on prevention and treatment.” P4 noted, they “provide education and management, primarily teaching patients how to log their medications and blood sugar levels.” P3 reported, they “care for their patient by talking to them about medication administration, demonstrations, and teaching them about their disease.” P7 stressed they based the diabetes care and treatment on “where the patient was relative to the stage of their disease, with diet and exercise as significant components.”

Interview Question 2: Are You Familiar With T3D?

Overall, three participants (P1, P2, and P5) were initially familiar with T3D. P4 said, they “were aware of it, they knew it existed,” and two out of the seven participants were unfamiliar. Moreover, P1 said, “It is a new idea, and it makes sense there was a correlation between blood sugar and cognitive decline.” Furthermore, two participants indicated they were unfamiliar but researched T3D when hearing about this study and after giving informed consent. P7 remarked that they were unfamiliar with it and thought I had a “typo” in my document. The prevailing observation for Theme 2 was that most providers were unfamiliar with T3D. A notable consequential theme I discovered was that all the participants, whether familiar or not, indicated they researched and further familiarized themselves with the medical anomaly upon receiving the study consent.

Interview Question 3: Have You Treated patients With T3D?

The participants reported that they did not know there was a clinical term for T3D. Primarily, Theme 3 revealed that the participants have unknowingly treated their patients for T3D because they were providing the usual care for their patients with diabetes who may have also had some level of cognitive impairment or Alzheimer's and the clinicians were caring for their patients with Alzheimer's who happened to have diabetes. Four participants indicated that they realized now that they unsuspectingly treated patients with T3D. Furthermore, P1 said, "It is a new and evolving field." Most of the respondents noted they treat the symptoms or expressed that they had treated diabetes patients with cognitive impairment. P6 claimed they believe they have treated T3D patients because they have patients with diabetes who have "cognitive issues," but until that moment, they did not realize it was actually T3D.

Interview Question 4: What Clinical Services do You Provide for Your (Alzheimer's Patients With Diabetes) T3D Patients?

Two themes emerged from this question. The first, Theme 4, showed that the diabetes standard of care is provided with wraparound services/coordination of care. P6 said, "We try to coordinate them with our dietitian and social worker to find out what kind of needs they have." P5 noted, "They have a home skilled nurse, a social worker, a dietitian, physical therapy, occupational therapy, speech therapy."

Notably, Theme 5: Family and caregiver support was perceived as being highly important. The participants who understood they were treating T3D saw the need for caregiver education and family support due to the patient's memory deficits. The response to this question was consistent among all participants. Education, in the form of, educating the patient and their family members or caregivers, was the predominant theme. P2 noted,

> When you're dealing with the patient, the family member does not remember the patient. They remember the old family member who did not have this cognitive impairment. So there's that confusion. I try to emphasize a lot on teaching the caregiver and trying to tell them what to expect and how.

Additionally, P2 said there is a focus on the caregiver because there is a "big strain on them."

Referral, coordination of care, and cognition were other codes presented in this interview question. P3 surmised that although they have not treated a T3D patient, they would be concerned with the patient's memory and "forgetting." P3 believed the patient would need a daily reminder or demonstration because "they would be dealing with repetitious types of medications such as insulin." P6 found that care coordination is pertinent and works with the caregiver, spouse, dietician, and social worker to see if they have needs in the home.

Interview Question 5: Do You Feel Confident Treating Patients With T3D? Why or Why Not?

Theme 6 was observed from this question; the observation was that most of the study participants were confident but noted some hesitation regarding the patient's cognitive issues. All but one participant said they were confident; Participant 4 remarked they were not confident and mentioned, “At this point, I do not feel confident because I don't know enough about it.” However, P1 said that although they were confident, "Dementia and cognitive changes are challenging as they were often addressed late.” Also, P4 said, “Everyone with T3D is not going to have the same deficits, so the treatment would have to be individualistic.” P2 said they are confident and tells their patient that if they do not manage their diabetes, “they will have symptoms with their eyes and nerves.” P2 informs the patients that T3D will affect their brain. P2 also asserts they focus on treating the patient’s diabetes so that there is a better chance of decreasing the progression of the “mental clarity.” P7 would feel confident in treating T3D patients; however, this is “based on caregiver ability” in that the caregiver would have to be willing and able to do the patient’s treatment and management. P7 expressed they would assess the caregiver first. Further, P6 is confident in treating patients with T3D because they see their patients’ multiple times a week in their line of work, so they can pick up on it if there are significant changes. They also have dedicated team members whose sole role is to monitor patients and recommend treatments as needed.

Moreover, the family and patient's acceptance of cognitive decline appeared as a concern expressed by the providers; as noted above, having the caregiver and family accept their loved one's mental decline becomes a struggle mainly because the family member will not admit their loved one is no longer the person they have known, at times they think of it as a temporary situation and not one with long term consequences, this can lead to the patient not receiving adequate or necessary treatment.

Interview Question 6: When Caring For Your T2D or T3D Patients, What Barriers Have You Encountered? Theme 7 was related to disease management and an overarching theme of insurance coverage. Altogether, the participant's responses to the question ranged across the board; three participants emphasized insurance as the barrier, two claimed patient understanding, and two said non-compliance is the barrier. P6 posits, "Noncompliance is one of the biggest things, along with diet and dietary controls." Surprisingly, P7 implied exertion is a barrier; patients become "tired or exhausted with the demands of managing their illness." They become worn out and tend not to want to follow through on recommendations." P7 claims there are barriers to putting patients on insulin; when mentioned during the visit, they (the patient) will not return to appointments or disappear for months.

Regarding insurance issues, Participant 1 noted that "getting referrals is three months out." P7 mentioned that the patient's physical and mental abilities are a barrier. Lastly, P3 said the number one barrier for treating patients is education, specifically for the patient; literacy is an issue as we need to make sure it is put in "laymen's terms."

Interview Question 7. Are You Experiencing Barriers With Insurance Companies? For Example, Do They Cover The Cost of Care? To further address insurance as a barrier with the participants, Theme 8 was resistance by the insurance company when it came to dealing with the insurance companies and the quality of care; it ranged from getting them to cover diabetes supplies to how insurance companies look at disease and the level they pay for the cost of care. P3 said, “They do cover, but what worries me is that sometimes we’ll have to fight like tooth and nail, especially for patients who are in need of insulin shots, especially several times a day.” P3 said, “We have to explain to the insurance company how they check the blood sugar four to six times a day, so they look at the cost.” P4 indicated, “It’s been a fight, but I think they’ve kind of pulled up and realized it is not going away.” P4 also noted, “There will be some pushback with the lancets, the strips, you know, the supplies that the patients need,” P4 expressed, “Either the provider or the pharmacist may have to go the extra mile with the insurance.” Insurance companies often use a tiered system to determine the patient's level of care. Prior authorization, denials, and approvals are factors that can affect the patient's health outcome, mainly because the provider is trying to improve blood sugar control and mental capacity. P7 shared that access to newer meds was an issue, and “sometimes they did not have the latest and most expensive treatments unless they could justify it.” P3 stated, “They [insurance companies] tend to go toward the lower side; they prefer switching to what might be more cost-effective to them.”

Interview Question 8. Are You Familiar With The Cost Of Care For T2D Compared To T3D? If So, Do You Feel The Reimbursement Rate For Caring For T3D Compared To T2D Is Equitable? Overall, providers agreed as they mainly claimed they were uncertain about the current cost; however, most believed when compared to T2D, the cost of T3D care would be much higher. For example, when treating T2D patients under standard conditions, the providers' care would not involve neurological interventions or consideration. Whereas for T3D, this is a necessary service as Alzheimer's is a neurological deficit. Thereby, Theme 9 was forecasted with the participants believing since T3D is a dual phenomenon, the cost to care for a patient with T3D will be at least double what is paid for T2D. Expressively, the cost of coverage and what the insurance company is willing to pay for care, whether it’s the cost of medications or diabetes supplies, is already a barrier, such that when considering the comorbidity of a T3D diagnosis, the cost will more than likely be remarkably high with more pushback on what they will cover. P5 notes, “It's exponentially higher depending on the complications and the comorbidities.” Additionally, P5, who already deals with reimbursement and insurance coverage, argues it is higher because the patients tend to be “noncompliant. The utilization in the acute care facility is higher than the normal type 2 diabetic that understands and follows the treatment plan.”

The Research Questions

After completing the data analysis, I observed nine themes from the interview questions (Table 2). In addition, the questions produced sufficient information to answer the research questions.

For Interview Questions 1 -7 several themes emerged that represented the provider's experience in treating their patients with diabetes. Notably, there was little experience in treating T3D patients, as there was diminutive knowledge of the disease. The providers did, however, care for their patients with the usual diabetes standard of care for treating T2D patients, offering disease management, referrals, and caregiver education and support. Insurance cost and coverage also played a role in the medical provider's experience with services required to treat T3D patients compared to T2D patients. Interview Questions 7, 8, and 9 provided answers to Research Question 2 regarding the clinicians' perception of the cost of diabetes care. Ultimately, the participants said, the cost of treating T3D patients would be much higher because additional services are required to care for a person with a dual diagnosis. A disease with mental deficits would require more care, which equates to more money.

TABLE 2

THEMES AND RESEARCH QUESTIONS

Themes	Research Question 1	Research Question 2
1. Providers are not specifically treating for T3D.	X	
2. Most of the providers were not familiar with T3D.	X	
3. Most participants have unknowingly treated their patients for T3D	X	
4. Diabetes care involves wraparound services/care coordination.	X	X
5. Family and caregiver support is essential.	X	
6. Providers are confident but hesitant when dealing with cognitive issues.	X	
7. Insurance coverage is an issue. Resistance.	X	X
8. Patient noncompliance/resistance, nonacceptance.	X	X
9. The cost of care for T3D will double.	X	X

Note. X = the research question was answered.

Summary

In this chapter, I discussed the study setting, the data collection and analysis, and the study findings. The purpose of this study was to investigate the clinical providers' experience in treating T3D patients when compared to T2D patients. The goal of Chapter

4 was to present the data collected from eligible study participants and clinicians who treated diabetes patients. After recruiting seven clinical providers who qualified for the study, I asked a set of eight IRB-approved questions to which all participants responded to each question. Data created from the study were analyzed, thematized, and categorized. The impending results generated answers to both research questions.

For Research Question 1, the providers' experience with services required to treat T3D patients compared to T2D patients is limited in the scope of work as T3D is not a recognized diagnosis; however, the treatment that is given is based on the current guidance for treating patients with T2D. For Research Question 2, concerning the clinician's perception of the cost of T3D compared to T2D is unknown but speculative; the expectation is that more care would be necessary given the neurological deficits that come with cognitive impairment. While endocrinology disorders like diabetes and neurological ailments like Alzheimer's are individually costly, one can only presume that combining both diseases will require expensive care.

Chapter 5 will provide a discussion of the interpretation of the findings, study limitations, Implications, and conclusion of the T3D study.

Chapter 5: Discussion, Conclusions, and Recommendations

In this grounded theory study, I investigated medical providers’ experiences with the health care services needed to treat T3D patients by reviewing the current care of T2D. The data collection tool was developed by me to capture the participants’ interview responses.

Interpretation of the Findings

T3D is a progressive form of T2D that presents with cognitive impairment. The ailment is slowly receiving acknowledgment from the scientific and medical communities, and because it is not fully recognized, there is no established disease treatment or care. The purpose of this qualitative, grounded theory study was to review the current model of care physicians use to treat patients with diabetes. The key findings revealed that most providers were unfamiliar with T3D, and the care they gave was based on the current standards of care for T2D. The results also revealed that physicians rely on the coordination of care by other service providers and caregivers. Regarding provider knowledge of the cost of care for T3D, the data revealed the providers’ expectations of the cost of T3D to be exponentially exaggerated because of the dual diagnosis of diabetes and Alzheimer’s.

The TRC is used to explore how integrating services is pertinent to good clinical outcomes (RCC, 2021). In the current study, a common theme expressed by the providers was that care coordination was vital to treating patients with diabetes and cognitive impairment, thereby reflecting the TRC. The participants mostly worked with caregivers and other ancillary service providers. Coordinated care combines the treatment efforts for providers in the diabetes realm and the neurological area, as well as integrating services with nutritional management along with the caregiver.

I also applied Bandura’s SCT, founded in 1960, to the study. Bandura’s theory measured knowledge and self-efficacy or obstacles in offering the appropriate care. For Interview Question 5, I asked the providers if they felt confident treating patients with T3D. All participants except one noted that they were confident in treating their patient’s T3D. The results reflect how self-efficacy is instrumental in the providers’ confidence level when treating patients with diabetes with cognitive impairment or Alzheimer’s.

Limitations of the Study

As noted in Chapter 1, a potential limitation of this study was identifying providers who had treated patients with a diagnosis of T3D. This ended up being the case, and although the participants were from varying specialties and all worked in the diabetes space, it was challenging to recruit clinicians who knowingly treated patients for T3D. However, I did find many clinicians who treated T2D patients who had a form of cognitive impairment or Alzheimer’s.

There was also a limitation related to the participants’ lack of recognition of the term T3D. Most of the participants did not know or had never heard of the term T3D. Furthermore, even though T3D was defined in the informed consent form included when recruiting for the study, I still had to explain what T3D was and its implications to the participants.

Recommendations

Researchers have been studying a possible connection between diabetes and cognitive impairment at the physiological level. Nguyen et al. (2020) found the current research reveals a link between diabetes and Alzheimer’s; however, there remains a gap in the literature with few studies focused on T3D and its implications on the health care system’s standard for treatment or the costs of care. Moreover, the disease has not been confirmed, diagnosed, or accepted by the healthcare systems of care. Once the medical community accepts T3D, further research can be done to investigate the appropriate standards for care and how the cost of care will impact the healthcare system. In the meantime, the metabolic community can work to increase awareness about the probability of cognitive impairment for those diagnosed with diabetes and initiate preventative measures for their patients after diagnosis. Including neuro services as part of the care team at the start of diagnosis may benefit patients and the health system.

Implications

This study’s implications for positive social change are associated with how awareness of T3D will benefit the medical and scientific communities as they face a growing phenomenon, mainly because the global population is aging and diseases, such as diabetes and Alzheimer’s, are becoming increasingly prevalent. Thus, awareness of

T3D will be instrumental because understanding the severity of the disease may decrease the costs associated with this dual diagnosis.

Conclusion

Diabetes and cognitive impairments, such as Alzheimer’s, are prevalent in older populations (ADA, 2021; AA, 2021). According to He and Aleksic (2023) scientists are making a connection between the two diseases and are proposing T3D is a progressive disease in which a patient with diabetes has an increased chance of developing Alzheimer’s. He and Aleksic (2023) posited that 80% of people with diabetes have a higher risk of developing dementia. The current study indicated that clinical providers had a lack of experience when treating patients with T3D compared to T2D. Without experience or knowledge, clinicians cannot be expected to provide the necessary services to treat a patient with diabetes, and this becomes more concerning when the level of treatment for caring for patients with Alzheimer’s or some forms of cognitive impairment are added to the diagnosis. The current study illuminated the need for T3D awareness among the medical community, insurance companies, caregivers, and those stakeholders who care for patients with diabetes. The findings have further demonstrated the concern for the cost of caring for patients with a disease like T3D, given the nature of the disease and its dual hit to health care (i.e., in the forms of both diabetes and Alzheimer’s). The ailments on their own burden the healthcare system, so it can be surmised that the two-for-one diagnoses can only increasingly put more pressure on the cost of treating patients with T3D. Increasing awareness and educating the health care network and scientific communities will help make a proper diagnosis, finally allowing providers to ensure their patients receive the appropriate care needed to treat their T3D.

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