Quality Improvement: Improving Type 2 Diabetes Self-Management and A1C Levels in Older Adult Veterans Using an Automated Message System

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A DNP PROJECT

Quality Improvement: Improving Type 2 Diabetes Self-Management and A1C Levels in Older Adult Veterans Using an Automated Message System

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Table of Contents

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Abstract

Background: Diabetes mellitus is prevalent among the US population; particularly type 2 diabetes. As the population ages, the number of adults 65 years of age or older with diabetes is increasing. Diabetes is also common among U.S. veterans. Approximately 25% of U.S. Department of VA patients have diabetes. Evidence demonstrated a prevalence of diabetes among older veterans. Innovative approaches to improve diabetes care and health outcomes for veterans are needed.

Aim: This quality improvement (QI) project examined the use of a unidirectional automated text message system (Annie) to improve self-management behaviors of veterans with Type 2 diabetes, as evidenced by glycated hemoglobin (HbA1c) and self-reported behavior change.

Methods: Participants were selected from an outpatient VA clinic in Florida. Evidence-based diabetes self-management education was implemented in older veterans with Type 2 diabetes through Annie to improve self-management behaviors and reduce HbA1cs within 90 days. A pre- and postintervention Summary of Diabetes Self-Care Activities questionnaire determined if behaviors improved after evidence-based education. Baseline HbA1c data were compared to the postintervention data to determine if diabetes outcomes improved among older veterans who received diabetes education through Annie.

Results: Findings demonstrated clinical changes in diet and foot care, with statistical significance only seen in foot care. Although no statistically significant changes were observed in HbA1c points for this project, some clinically significant reductions were seen when comparing mean pre- and postintervention HbA1cs.

Conclusion: Results suggest that continued implementation of Annie among older veterans could improve Type 2 diabetes self-management and reduce HbA1c levels.

Quality Improvement: Improving Type 2 Diabetes Self-Management and A1C Levels in Older Veterans Using an Automated Text Message System

Background and Significance

Diabetes mellitus is a prevalent chronic condition in the United States. Nearly 11% of the U.S. population had diabetes in 2018, equating to 1 in 10 people (American Diabetes Association [ADA], 2022). In the United States, there are 1,400,000 new cases of diabetes every year. Data from 2019 showed that 96,000,000 American adults were prediabetic (ADA, 2022). Approximately 37,000,000 individuals currently live with diabetes (Centers for Disease Control and Prevention [CDC], 2022), up 7,000,000 from 2018. Roughly 29,000,000 of the 37,000,000 had a diagnosis of diabetes, while 8,500,000 were estimated to be undiagnosed (ADA, 2022). The CDC (2021) reported that about 33,300,000 to 35,100,000 of the 37,000,000 people diagnosed with diabetes have Type 2 diabetes, and the remainder has Type 1 diabetes. In 2019, this long-term chronic condition was named the seventh leading cause of death. Overall, the health care expenditure in the United States for patients with diabetes is around $327 billion, with about $237 billion spent on direct medical costs and the remainder accounting for lost productivity (ADA, 2022). These numbers are a two-fold increase of what the health care expenditure would be without diabetes (ADA, 2022).

Problem Statement

Duval County in northeast Florida has a higher death rate for diabetes than the state overall (Verité Healthcare Consulting, 2016). The county reported 27.7 deaths per 100,000, while Florida's rate was 19.6 deaths per 100,000 (Verité Healthcare Consulting, 2016). In 2018, the age-adjusted death rate for the county showed only a slight decrease from 27.7 to 23.3 deaths per 100,000 (Conduent, 2019). In addition, the county was noted to have more than a 50% higher

rate for preventable hospitalizations than the state. In a community assessment completed by the University of Florida Health Jacksonville, most interviewees from the community believed that diabetes is perceived as a significant health issue (Verité Healthcare Consulting, 2016). Diabetes in the Medicare population for Duval County was approximated at nearly 31%, compared to 28% in the Medicare population for Florida (Conduent, 2019). A community needs assessment led the University of Florida Health Jacksonville to set a goal of increasing the self-management abilities of community members with diabetes in Jacksonville, Florida, the seat of Duval County (University of Florida Health Jacksonville, 2019).

The population of older adults with Type 2 diabetes is growing. Information from the *National Diabetes Statistics Report* stated that the prevalence of diabetes increased with age based on crude estimates in 2018 (CDC, 2022). The prevalence of diabetes in individuals 65 years and older remains high, at about 1 in 4 older adults, nearing 27%, including those diagnosed and those estimated to be undiagnosed (ADA, n.d.-b). Data from the 2016 time frame showed that roughly 23% of the U.S. population ages 65–74 years and 21% ages 75 years older had diabetes. Specifically, these numbers were about 24% and 22% in Florida, respectively (Kaiser Family Foundation, 2016). Other statistics report that number to be as high as 35% in adults over 65 years old (Endocrine Society, 2022).

Older adults are at high risk of developing Type 2 diabetes due to the combined effects of increasing insulin resistance and impaired pancreatic islet function with aging. In addition, older adults with diabetes are at an increased risk for complications. In this population, the burden of diabetes is often related to its impact on longevity, functional status, and risk of institutionalization (ADA, n.d.-b). Secondary complications are more likely in this population, including hypoglycemia, renal impairment, and heart disease (Endocrine Society, 2022). This

population is likely at risk for both acute and chronic microvascular and macrovascular complications of the disease (Kirkman et al., 2012). For the geriatric population with moderate comorbidities and a life expectancy less than 10 years, a target HbA1c of 7.5%–8% is recommended. A target HbA1c of 8%–8.5% is recommended by the ADA for older adults with complicated medical issues (American College of Cardiology, 2018).

Not only is diabetes prevalent among older adults, but evidence shows that it is also common among U.S. veterans, who compose 9% of the civilian U.S. population. Diabetes is also more prevalent among U.S. veterans than the general population (Liu et al., 2017). Of the 8,000,000 veterans cared for by the Veterans Administration (VA) health care system, approximately 1 in 4 is impacted by diabetes. There is a mortality rate of 5% yearly among this population. These high rates, compared with the general population, may be due to the increased proportions of overweight (37%) and obesity (41%) among veterans, older age, lower socioeconomic status, and possible exposure to herbicides such as Agent Orange (Avramovic et al., 2020; U.S. Department of Veterans Affairs, n.d.). Similar to other individuals with diabetes, diabetes is the main reason for vision impairment, renal dysfunction, and amputation of limbs in VA patients. Effective prevention and intervention, including preventative behavioral interventions, are needed to improve their health status and reduce its incidence by 50%–70% (Avramovic et al., 2020; Liu et al., 2017).

Type 2 diabetes management is complex and primarily completed by the diagnosed individual (Dobson et al., 2016). People with this chronic disease must make many daily self-management decisions and perform complex care activities (Powers, 2015). As evidenced by glycemic control, adequately managed Type 2 diabetes is reached with regular physical activity, diet control, and treatment or medicine compliance (Dobson et al., 2016). Poor management can

lead to undesirable microvascular and macrovascular complications including skin infections, retinopathy, neuropathy, nephropathy, hypertension, and even stroke (ADA, n.d.-a).

Poor self-management and nonadherence to treatment regimens are the main reasons for uncontrolled chronic conditions and exacerbation, disproportionate use of drugs, and recurrent readmissions (Fernandes Martins et al., 2017). In 2012, the United States spent upward of $100 billion in health care-related costs due to failure to comply with treatments for various chronic conditions, including Type 2 diabetes (Gentil et al., 2015). Type 2 diabetics often fail to achieve self-management goals (Capozza et al., 2015). Recent research has noted a correlation between adhering to hypoglycemic agents and enhanced diabetes control (Gentil et al., 2015). This relationship indicates that clinicians must present their patients with innovative methods that highlight the rising problem of diabetes, support compliance for glycemic control, improve overall health and well-being, and prevent accompanying long-term complications (Dobson et al., 2016, 2020).

Office visits for diagnosing and treating chronic diseases have traditionally been a staple in health care (Corbett et al., 2020). However, many patients' chronic diseases are not well controlled. Only 50% of patients with chronic medical conditions take their medications as prescribed (Ju, 2020). While technologies cannot ever entirely substitute an in-person office visit, the ever-increasing presence of technology in daily living makes it a resourceful means to improve self-management behaviors (Corbett et al., 2020; Dobson et al., 2016). Technology such as telehealth has advantages to combat drawbacks of office visits that lead to treatment nonadherence and poor outcomes in patients (Corbett et al., 2020). Mainly, text messages are practical for enhancing self-management support because they are ubiquitous, making them a desirable resolution for disease management for those diagnosed with Type 2 diabetes (Arora et

al., 2014; Dobson, 2016). Text message-based health interventions provide patients with reminders, education, or self-management assistance for a broad spectrum of chronic conditions. Text messages may be standardized or tailored to specific patients, sent at varied frequencies based on the intervention, combined with other approaches, or delivered as part of a stepped care or progressive intervention tailored to patients' needs. Electronic health records (EHRs) can also integrate with smartphone apps to send alerts to patients (University of Wisconsin Population Health Institute, 2019).

Telehealth improves access to care, and meta-analyses have shown telehealth being comparable to in-person visits for diverse chronic conditions (Corbett et al., 2020). Advancements in information technology have introduced innovative telehealth interventions, which are valuable and acceptable for diabetes self-management education and support for patients and providers (Ju, 2020). Efforts by the VA in diabetes research have been ongoing since the late 1970s, and new methods are being investigated (U.S. Department of Veterans Affairs, n.d.-c). Emerging research for veterans with diabetes includes examining innovative approaches and technologies, including telemedicine and internet-based education, to improve diabetes care and improve veterans' health outcomes. VA researchers' newer efforts include employing enhanced ways to prevent or treat diabetes, especially in special populations, including the elderly (U.S. Department of Veterans Affairs, n.d.-c). Still, more work is needed given the impact diabetes has currently on veterans. This is especially true of the veteran population of Duval County, which has been estimated at 12% of the county's population. Compared to Florida and the United States, Duval County leads in its percentage of veterans at nearly 3% and 4%, respectively. Thus, the present doctoral QI project aimed to use a unidirectional automated text-message system to enhance the management of older adult

veterans diagnosed with Type 2 diabetes, as evidenced by HbA1c and improved self-management behavior change.

A local assessment of the geriatric clinic at the VA North Florida/South Georgia Veterans Health System (NF/SGVHS) showed that the Annie text messaging application adopted by the VA to enhance self-management behaviors was not being used for older veterans with Type 2 diabetes or being used at the local North Florida/South Georgia outpatient clinic. Currently, thousands of veterans successfully use Annie to maintain or improve their wellness targets (Yakovchenko et al., 2019). Annie is a part of a standard of care aiding veterans with other chronic conditions such as liver disorders, anxiety, asthma, diabetes, human immunodeficiency virus, high blood pressure, weight loss, and smoking cessation. Through stakeholder assessment of the geriatric clinic at North Florida/South Georgia, it was identified that this clinic would benefit from this QI project as the geriatric clinic has veterans with uncontrolled Type 2 diabetes and was interested in helping veterans in the local setting improve their diabetes management.

Purpose Statement

The purpose and goal of this QI project was to implement evidence-based diabetes self-management in older adult veterans diagnosed with Type 2 diabetes through text messages to improve self-management behaviors and reduce HbA1c within 90 days. A pre- and postintervention Summary of Diabetes Self-Care Activities (SDSCA) diabetes self-management assessment questionnaire was used to determine if diabetes self-management behaviors improved after evidence-based diabetes education. Baseline HbA1c data were compared to postintervention HbA1c data to determine if diabetes outcomes were improved among older veterans who received diabetes education through unidirectional automated text messages. The Doctor of Nursing practice (DNP) lead sought to determine if Annie would improve diabetic

outcomes in this local clinic and improve communications between providers and their older veteran patients. The aim of the project was determining how to make the Annie application work in the local setting. The educational reminders, sent through the Annie application, helped to determine if diabetes outcomes improved through using said tools in the local setting, as evidenced by improved diabetes self-care activities such as regular physical activity, diet control, and treatment or medicine compliance (Dobson et al., 2016). The local clinic agreed to the DNP lead implementing this QI initiative.

Definition of Key Terms

Diabetes: A chronic state of hyperglycemia that results from the body's inability to metabolize blood glucose (CDC, 2022).

Diabetes self-management education: The knowledge, skills, and abilities provided to diabetic patients essential for their self-care that have been shown to produce quality outcomes (Powers, 2015).

Hemoglobin A1C (HbA1c): The average blood glucose level over the past 2–3 months is given as a percentage. This average reveals the amount of glucose that adheres to red blood cells, representing a relative estimate of circulating glucose (CDC, 2022).

Macrovascular complications: Complications relating to larger blood vessels due to diabetes such as heart disease or stroke (Endocrine Society, 2022).

Microvascular complications: Complications in small blood vessels such as eye problems or kidney disease (Endocrine Society, 2022).

Older adults: Age 65 years or older (Endocrine Society, 2022).

Telehealth: Health care and services provided at distance using electronic and telecommunications technologies (American Academy of Family Physicians, n.d.).

Type 2 diabetes: A chronic state of hyperglycemia that develops due to a lack of insulin or the body's inability to use insulin efficiently. Type 2 diabetes can develop in children and through the rest of the lifespan but is mostly seen in middle-aged to older adults (CDC, 2021).

Veterans: Individuals who have served in the active military and separated from the military for circumstances not considered dishonorable (U.S. Department of Veterans Affairs. (n.d.-d).

Available Knowledge

The following PICOT question was asked to guide the literature review: "In older veterans with Type 2 diabetes, does the use of unidirectional educational text messages improve self-management behavior and improve HbA1c levels within 90 days?" The population (P) identified was older adult veterans with Type 2 diabetes, the intervention (I) was diabetes self-management education and support delivered through an automated text message, there was no comparable group (C) outcome (O) was identified as HbA1c level as well as self-management behavior, and time (T) was identified as within 90 days.

Search Process

A total of 93 scholarly articles were selected and examined to provide a thorough review of the available knowledge. Journal articles from 2014–2020 were explored to review the literature on Type 2 diabetes, text messaging, glycemic control, older adults, veterans, and self-management behavior. Multiple databases were used for this process, including Ovid, PubMed, ProQuest, the Cumulative Index of Nursing and Allied Health Literature, and Google Scholar. A filter employed for this search process included full-text works published in recent years. To ensure the search was further limited, keywords and search terms such as *text messages*, *Type 2 diabetes*, *self-management*, *veterans*, *technology*, *hemoglobin A1C and self-care behaviors*,

geriatrics, and *older adults* were used. The search process produced 42 articles contributing to the literature review to support improving Type 2 diabetes self-management and HbA1c levels in older adult veterans using an automated message system.

Review of Literature

There is a vast amount of research on the relationship between text messages, Type 2 diabetes, self-management behavior, technology, and HbA1c. The themes identified from the literature included self-management, glycemic control and text message systems, older adults and mobile technology, veterans and diabetes, and text messaging and adherence.

Diabetes Self-Management

Text messages have been established as a vehicle for enhancing patient outcomes by providing disease management support (Arora et al., 2014). An integrative review on the use of text messages in self-management of Type 2 diabetes showed that most studies had favorable findings, including a decrease in HbA1c, increased adherence to medication, improved healthy behaviors, and improved knowledge of diabetes (de Andrade Hovadick et al., 2019). A randomized controlled trial identified that adult subjects diagnosed with diabetes had an increase from 4.5 to 5.4, on an 8-point scale, in compliance with their prescribed treatment when measured by the Morisky Medication Adherence Scale after using a text message-based intervention in the emergency department for 6 months (Arora et al., 2014). Compliance with medication, measured through pharmacy claims, declined from 84%–87% to 77%. Unlike Arora et al.'s (2014) findings, Gatwood et al. (2016) showed that using daily tailored text messages did not enhance medication noncompliance or health beliefs or attitudes.

Zhou et al. (2016) assessed the influence of a smartphone-based management application and noted that 84% of the study participants found it helpful. Increases were also seen in diabetes

understanding, blood sugar monitoring, and self-management activities in the experimental group (Zhou et al., 2016). A study evaluating the efficacy of a text message intervention on the education of general self-management in individuals with Type 2 diabetes and the impact of tailored educational messages showed an increase in self-management behavior after 12 weeks (Peimani et al., 2016). Nepper et al. (2019) examined the effects of educational text messages on diabetes self-care activities, cardiovascular disease risk awareness, and home food availabilities related to food choices among patients with Type 2 diabetes. After receiving usual care and three educational text messages weekly for 12 weeks, 94 % of the participants receiving text messages indicated the usefulness of this program and demonstrated the same level or minor improvements in diabetes self-care activities after the intervention as evidenced by previously validated tools, including the SDSCA, the Block Fat-Sugar-Fruit-Vegetable Screener, a home food self-inventory checklist, and a researcher-developed inventory. The pilot study results suggested the feasibility and usefulness of the text message program for diabetes education (Nepper et al., 2019).

Watterson et al. (2018) examined a 12-week bidirectional text-messaging curriculum geared toward 50 low-income Latino patients undergoing care for diabetes at two health care organizations. Results showed a mean HbA1c decrease of 0.4 points with the intervention instead of 0.6 points in the comparison group. Patients with a response rate greater than or equal to 64.5% experienced a 2.2-point reduction in HbA1c comparable to those less engaged. Qualitative analyses demonstrated that several participants felt supported, learned new information, set new goals, and received valuable alerts. Including patient responses in in-person clinical care and tailoring the messages to patient knowledge were strategies identified by staff and patients for program improvements (Watterson et al., 2018). Watterson et al. and Capozza et

al. (2018) similarly found that a bidirectional text messaging system providing behavioral coaching, education, and testing reminders to enrolled individuals with Type 2 diabetes in the context of a clinic-based quality improvement initiative could enhance self-management support and in turn decrease HbA1c.

Text Message Systems and Glycemic Control

After 90 days of using a tailored text messaging system for diabetes education, Peimani et al. (2016) found that educational text messages and standard diabetes management could enhance glycemic control. When compared to nontailored messages, tailored messages were not more noteworthy. The results indicated that HbA1c was only modestly changed; however, there were substantial decreases in fasting blood sugar and body mass index (Peimani et al., 2016). Unlike Peimani et al., outcomes from a randomized control trial implementing text messages showed a reduction in HbA1c levels in Arora et al. (2014). There was a 1% reduction in HbA1c among participants in the experimental group and a 0.6% reduction in control group participants at 6 months (Arora et al., 2014).

Comparable outcomes were reported in a randomized pilot study employing a smartphone-based diabetes management application. Zhou et al.'s (2016) results showed a statistically significant improvement in HbA1c. The experimental group showed an overall drop of nearly 2%, and the control group showed a decrease of approximately 0.8% (Zhou et al., 2016).

Dobson et al. (2020) evaluated the long-term effects of a text messaging system designed to enhance self-management of diabetes and glycemic control after 2 years in adults with a HbA1c of greater than 8%. Study outcomes showed that after 2-year follow-up of a randomized

controlled trial, the intervention group had a substantially significant decrease in HbA1c when compared to the control group, at –10 mmol/mol and 1 mmol/mol, respectively.

In Huang et al. (2019), synthesis of 13 articles on the effect of a text message intervention on HbA1c showed a statistically significant decline in HbA1c. Overall, the decrease was –0.62%, with the most extended study duration (12 months) having a drop of nearly 2%. Other studies noted a substantial decrease in fasting blood sugar 2 hours after eating (Huang et al., 2019). Similarities were pointed out in a meta-analysis by Hou et al. (2016). Findings showed that every study involving Type 2 diabetes showed a reduction in HbA1c, with an average 0.5% decrease noted.

Fortmann et al. (2017) found that texts were a quick way to potentially overcoming the "digital divide" to improve care. High-risk Hispanic individuals with Type 2 diabetes found that using a simple, low-cost text messaging program was highly acceptable. Using the program also resulted in more significant improvements in glycemic control compared with usual care. When addressing health literacy status regarding patients using text message interventions, Bergner et al. (2017) showed that text messaging might have the potential to reduce Type 2 diabetes health disparities related to limited health literacy.

Older Adults and Telehealth Interventions

Older people have been underrepresented in treatment targets for diabetes and its associated conditions (Kirkman et al., 2012). Older adults use telehealth tools in diverse health promotion programs and outside formal programs to monitor and improve their health (Kampmeijer et al., 2016). The successful use of e-health/m-health tools in health promotion programs for older adults significantly depends on the motivation and support older adults receive when using e-health and m-health tools (Kampmeijer et al., 2016). Lilje et al. (2017)

explored older persons' everyday experiences receiving text message reminders of home exercises after specialized manual therapy for recurrent low back pain. Study participants appreciated the messages, which were perceived as timely and usable and stimulated memory (Lilje et al., 2017).

A study exploring mobile messaging preferences by age found that older adults had similar messaging choices to younger adults (Kuerbis et al., 2017b). Specifically, the older adult group demonstrated preferences for texts that were grammatically correct, did not use textese, referenced an internal locus of control, were benefit oriented, were directive, included positive images, were without humor, that employed statements and not questions, and were nonaggressive and polite. They also preferred messages with single punctuation and "you" statements (Kuerbis et al., 2017b). Kuerbis et al. (2017b) concluded that texts are possibly an inventive way to reach people homebound or geographically isolated with health issues.

mHealth has been linked with enhanced self-management and quality outcomes among individuals with heart failure. In a study of 129 older adult patients with heart failure who mostly used smartphones regularly, investigators discovered that participant intention to embrace mHealth was shaped by their opinions of mHealth's efficiency and usability (Cajita et al. 2017). A solid majority of the study sample, 86.1%, indicated that their clinicians' views were valued most when considering mHealth adoption relative to their health. Moreover, when questioned whether they would adopt mHealth if their provider advised it, approximately 64% agreed (Cajita et al., 2017).

Robin et al. (2019) used a randomized parallel trial design to assess if daily text prompts to practice mindfulness would positively impact the time that adults aged 50 years or older spend in aerobic physical activity. Participants were exposed to the experimental conditions for 4

weeks with or without the morning text message. In the morning message condition, the mindfulness groups received a text message with the instruction to practice audio-guided mindfulness for 10 min, and the control group received a placebo message. The participants practicing mindfulness reported significantly more weekly minutes of aerobic physical activity and higher intrinsic motivation than the control participants (Robin et al., 2019).

Kuerbis et al. (2017b) projected that between 2010 and 2030, the older adult population will increase in older adults from 40,300,000 to 72,100,000. Older adults have high rates of health care utilization and expenses. Stereotypes perpetuate that older adults underutilize mobile technology and are unlikely to accept a mHealth intervention (Kuerbis et al., 2017b).

Older adults are commonly thought to lack interest in and ability to adopt technologies; however, recent studies have shown that many older adults currently use mobile technology and are open to existing mobile interventions for health reasons. They are comfortable adopting technology, have positive attitudes toward mobile technology, and have high user uptake with proper training and guided facilitation (Kuerbis et al., 2017b; Takemoto et al., 2018). Cost, a significant barrier to mobile technology use among older adults, is the same barrier across the general population. According to Kuerbis et al. (2017a, 2017b), mHealth interventions should be a complimentary service to facilitate face-to-face contact with health care providers and not the primary service so as to not further contribute to social isolation among older adults, a key factor in poor outcomes in this population.

Richardson et al. (2018) sought to identify how mHealth provided support for older adults' needs regarding patient–provider communication. Their findings showed that smartphones that focus on supporting medication management, enhancing communication with providers, and facilitating connectedness in social networks to reduce feelings of isolation might

help to improve outcomes in older adults with chronic conditions—specifically pain. Aiding in exchanges with the health care system such as efficient scheduling and corresponding with local pharmacies are ways that smartphones potentially benefit older adults (Richardson et al., 2018). (Richardson et al., 2018).

Veterans and Telehealth Adoption

Short message service (SMS) is becoming an established vehicle for asynchronous exchanges concerning health care systems and patients, aiding in appointment attendance, medication compliance, and medication refill reminders (Yakovchenko et al., 2019). An automated texting system (ATS) at the VA enables clinicians to use texts to improve veterans' self-management and monitor their progress between in-person visits. In 2016, the VA began testing an ATS in texting programs used in the U.K. National Health Service, Australia, and Canada (Yakovchenko et al., 2019). The ATS, titled Annie after Annie Fox, the first nurse to be awarded a Purple Heart, helps veterans become more involved in their care through condition-specific protocols that emphasize critical points of care plans. The ATS can send one-way messages, understand patient messages following particularized language, and respond with bidirectional messages through rule-based logic (Yakovchenko et al., 2019).

The Annie program has demonstrated improved outcomes with continuous positive airway pressure monitor utilization in veterans with traumatic brain injury and in aiding veterans with anger management, liver disorders, anxiety, asthma, diabetes, HIV, high blood pressure, weight loss, and smoking cessation (Yakovchenko et al., 2019). In another study on an ATS, Jaenicke et al. (2019) used a message system for self-management of chemotherapy symptoms in patients with advanced cancer. Study results showed that an automated text messaging intervention was a cost-effective approach to symptom management (Jaenicke et al., 2019).

Sustainability of an ATS intervention may require approaches that operate at the clinic, provider, and patient levels (Yakovchenko et al., 2019).

McInnes et al. (2014) examined the feasibility of sending texts to homeless veterans to boost their involvement in care and lessen appointment no-shows. Results showed that the veterans were pleased with the text intervention, experienced few technical challenges, and wanted to continue the messages. Canceled visits and no-shows by homeless veterans decreased from 53 to 37 and 31 to 25, respectively. A statistically significant decline in emergency department visits, from 15 to five, was seen in participating veterans (difference of 10; 95% confidence interval [CI] = 2.2, 17.8; $p = .01$), and a drop in hospitalizations, from three to zero (difference of three; 95% CI = –0.4, 6.4; $p = .08$; McInnes et al., 2014).

Johnson et al. (2017) developed and piloted a stage-based mobile intervention for pain self-management for veterans. The mobile health intervention involved an option to receive tailored text messages along with gaming principles and social networking. Findings underscored that simultaneously addressing other behaviors may be a promising approach to managing pain and comorbid conditions (Johnson et al., 2017).

Numerous health information technology (HIT) resources are available to veterans to support their health care management, including a patient portal, VetLink kiosks, mobile apps, and telehealth services. The veteran population's variety of needs and preferences can potentially help transform the existing VA HIT design (Huan et al., 2019). A study aiming to explain veterans' encounters operating the current VA HIT and understand their insights for the future of a blended VA HIT system showed that although veterans often preferred the secure messaging feature, various HIT services were needed (Haun et al., 2017). Haun et al. (2017) then applied

these findings to develop veteran-driven simulations that represent and meet user expectations when using a VA HIT system.

In Connolly et al. (2018), interviews with veterans revealed a marked division regarding openness to smartphone apps, especially for mental health. Veteran interviewees reported mostly strong positive or negative views about their smartphone app use; some only expressed neutral views. Key differences were noted among veterans living in rural and urban areas. Rural veterans tended to have negative attitudes and reported difficulty using smartphones, economic barriers, and connectivity issues. Also, smartphone use among the rural veterans did not align with their values. These attitudes were the opposite of the urban veterans (Connolly et al., 2018).

Minimal differences were reported among veterans across the lifespan relative to smartphone app efficacy or compatibility with their lifestyle, thus highlighting that older adult veterans are more accepting of implementing HIT into their care than clinicians might expect (Connolly et al., 2018). However, obstacles with operating such systems in this population indicated that they may benefit from simplified app designs or smartphone training. Overall, Connolly et al. (2018) demonstrated that apps might be an appropriate adjunctive method for those who welcome them and that these individuals may very well benefit from this technology.

Text Messaging and Adherence

In a meta-analysis, Thakkar et al. (2016) found that mobile phone text messaging nearly doubled the odds of medication adherence in chronic disease. This increase translated into adherence rates improving from 50% to 67.8%, or an absolute increase of 17.8% (Thakkar et al., 2016). Similarly, Pandey et al. (2017) found that text prompts led to an average 14.2%-point increase in self-reported medication compliance compared to usual care (95% CI 7–21; $p <$ .001). The exercise trial showed that text prompts resulted in an added 4.2 days (95% CI = 1.9,

6.4, p = .001) and 4 hours (95% CI = 2.4, 5.6, p = < .001) of exercise per month when compared to usual care (Pandey et al., 2017).

Results from a 12-week randomized controlled trial diabetes awareness program at the Misr University for Science & Technology hospital in Cairo, Egypt, showed that SMS education was a feasible and acceptable method for improving glycemic control and self-management behaviors among Egyptian diabetics (Abaza & Marschollek, 2017). Like Abaza and Marschollek (2017), Shaw et al. (2020) found that the ever-present adoption of smartphones across diverse patient populations and the merging of data from mobile health devices into EHRs presented an opportunity to cultivate new models of care delivery for Type 2 diabetics and promote equity.

Summary of Current Evidence/Synthesis of Findings

Despite clinical diversity, the most identified theme throughout the current literature was that enhancing self-management of chronic conditions, including Type 2 diabetes, can be accomplished with text messaging systems. Not only can self-management be improved, but clinically significant improvements in HbA1c and emotional support can be provided by diabetes text messaging programs (Watterson et al., 2018). Patients self-reported improved self-management, and this was noted by the decreases in HbA1c. Some randomized controlled trials reported increased glycemic control with nearly a 2% decrease in glycated hemoglobin.

Improving diabetes self-management is essential in patients with diabetes. It is the key to a better quality of life for this population. The critical impact noted includes increased adherence to the treatment regimen, improvement in diabetes control, and enhancements with self-management measures. The literature shows that text messages are a complement to standard self-management and that implementing mHealth interventions could address restrictions to treatment, support frontline assessment, and expand access to care for the geriatric population

(Kuerbis et al., 2017b). SMS service is becoming an accepted means of asynchronous communication between the VA's health care systems and patients. It is also successful as an adjunct service in several chronic conditions (Yakovchenko et al., 2019). Following the promising conclusions from the literature, the current DNP QI project focused on determining whether improvements could be seen in self-management in older veterans with Type 2 diabetes using text messaging.

Theoretical and Quality Improvement Framework

Lewin's three-step change theory of nursing supported the QI project. This change theory aided in the transition from the usual diabetes chronic care regimen provided by the VA to implementing an automated text message diabetes educational program. The fundamental aspects of this change theory involve inspiration to change, making necessary alterations for change, and then sustaining the modified elements (Moran et al., 2018). This theory was fitting for the present DNP QI project because individuals had to be willing to participate and be motivated to improve their Type 2 diabetes management. By using text messages with educational and motivational messages to encourage self-care of Type 2 diabetes, participants gained knowledge about their chronic disease. Patients who gained knowledge by viewing the text messages saw improvements in the control of their diabetes, HbA1c, and, subsequently, their health. After seeing favorable results, participants are likely to sustain their changed behaviors. The three stages in this theory are unfreezing, change, and refreezing (Petiprin, 2020), discussed next.

Unfreezing

The unfreezing stage involves identifying the inefficient processes and recognizing ways to make change possible (Petiprin, 2020). For this QI project, a local assessment of the

NF/SGVHS outpatient clinic showed that the Annie application adopted by the VA for enhanced self-management behaviors was not being used for older veterans with Type 2 diabetes. The preintervention data collection of the HbA1c biomarker and the scores on the SDSCA questionnaire established a baseline assessment for this project.

Change

The change stage involves altering thoughts, feelings, and behaviors needed to drive patients in the intended direction (Petiprin, 2020). The text message intervention for the QI project was used three times a week for 3 months.

Refreezing

Data collection from the postintervention assessments, including HbA1c levels and SDSCA questionnaire scores, occurred during the refreezing stage. These data provided veterans, the DNP lead, and the local VA clinic with information about the success of the QI project. The hypothesis was that the text message intervention would enhance self-management behaviors and improve HbA1c levels. Thus, after seeing the benefits gained from the intervention, new habits can be established and become the standard (Petiprin, 2020).

The health belief model (HBM), established in the early 1950s, provides a theoretical basis for understanding why individuals do not adopt healthy behaviors such as disease prevention strategies (LaMorte, 2016). The HBM is an extensively used model that suggests communications are bound to reach ideal performance change if supposed obstacles are targeted (LaMorte, 2016). Thus, in other words, the framework employs constructs of health care consumer perceptions, in conjunction with their modifying elements and cues to action received, to produce a probability of assuming healthy lifestyle modifications (Arora et al., 2014). The various components outlined in the HBM assisted with employing effective interventions in the

present QI study to promote the well-being of veterans, as it has been endorsed and applicable to different health conditions, especially diabetes (Arora et al., 2014).

The components in the single-direction text message-based mHealth diabetes self-management system were designed to highlight education that could modify perceptions supporting the targeted healthy action and used prompts to stimulate the sought-out behavior (Arora et al., 2014). The following terms represent relevant definitions that provided a basis for the HBM with diabetes self-management support: (a) perceived severity; that is, individuals' judgment on the significance of their Type 2 diabetes and its related effects, (b) perceived benefits, or an individual's belief in the usefulness of the recommended diabetes self-management behavior to lessen related risks, (c) perceived barriers, or an individual's idea of the physical and mental costs of the recommended diabetes self-management behavior, and (d) cues to action, or tactics to trigger willingness to modify behaviors (Elder, 2018). Appendix A illustrates the HBM with diabetes self-management support. The independent variable (IV) is the unidirectional text message-based self-management system meant to improve glycemic control and change self-care behavior, the dependent variables (DV). Table 1 highlights the conceptual and operational definitions of the IV and DV of this project.

Table 1

Conceptual and Operational Definitions for Study Variables

Variable	Conceptual definition	Operational definition
IV: text messages	The text messages are intended to enhance participant behaviors and perceptions and attain healthy actions while providing cues toward partaking in healthily behaviors (Arora et al., 2016).	Enlistment and participation with the text messaging participants with Type 2 diabetes.
DV: hemoglobin A1C	An approximation of how well an individual has self-managed blood glucose.	Reflection of blood glucose during the previous 2–3 months (Mayo Clinic, 2018).
DV: diabetes self-care behavior	Engaging in practices relevant to individuals with or at risk of diabetes to manage their condition. These behaviors include healthy diet, exercise, blood sugar monitoring, medication adherence, problem-solving abilities, healthy coping, and risk reduction (Eva et al., 2018).	A reflection of the usefulness of text messages on self-management of diabetes as evidenced by higher average on SDSCA questionnaire after 3 months of educational/motivational text messages through Annie.

Note. IV = independent variable; DV = dependent variable; SDSCA = Summary of Diabetes Self-Care Activities.

Specific Aims

The goal of this QI project was to improve the self-care behavior of patients with Type 2 diabetes. Improved self-care behavior was achieved by sending patient educational/motivational text messages for 12 weeks to eligible and willing participants. Glycemic control, as indicated by HbA1c, is an outcome measure that reflected the effectiveness of the participant's behavior

change. Change in participant behavior, as indicated by a lower or higher score on the SDSCA, was an outcome measure that reflected the usefulness of text messages on diabetes self-care behavior.

Context

Participants were selected as a convenience group and were invited from a local North Florida/South Georgia Veteran Health System outpatient clinic in Jacksonville, Florida. The chronic care regimen nurse in the geriatric clinic provided the DNP lead with a list of all geriatric veterans who had an upcoming appointment for chronic care management appointments. Using the list provided by the local site, the DNP lead met with participants on site to explain the project and obtain their consent during the appointment. Geriatric patients were not sampled. While this population is considered vulnerable, the geriatric population was targeted because this veterans' health system clinic services only geriatric patients.

All geriatric veterans who were receiving care for Type 2 diabetes services could participate. The inclusion criteria were the following:

- speaking and reading English,
- owning a cellphone that can receive and send text messages,
- last visit HbA1c level greater than 8%, and
- ability to perform diabetes self-management activities (physical activity, blood sugar testing, maintaining a healthy diet).

The exclusion criteria were:

- patients with Type 1 diabetes,
- patients with newly diagnosed diabetes (less 3 months),

- patients who were physiologically unstable, as evidenced by hospitalization in the last 3 months,
- psychosis or any psychiatric condition that could interfere with the ability to perform diabetes self-management activities,
- past medical history of a cognitive deficit, and
- patients unable to complete informed consent for the QI project.

For this doctoral project, approximately 50 veterans were anticipated for the project. However, the project was open to all veteran patients with Type 2 diabetes in the geriatric clinic. Interested participants completed the informed consent and the printed SDSCA questionnaire in the clinic during their scheduled chronic care appointments. The SDSCA questionnaire is an 11-item survey; it took a total of 15 min to complete during the scheduled appointment. The DNP lead enrolled the participants in the Annie application after informed consents were signed. Participants' HbA1c baseline data were collected from the EHR. The HbA1c baseline data obtained for all participants were a current value, reflecting a level obtained within the previous 2–3 months.

Participants in this QI project continued to receive their standard care as determined by their primary care providers. In addition, participants received three unidirectional text messages each week for 12 weeks with information outlining healthy diabetes behaviors. Text messages were delivered through an ATS, Annie, used by the U.S. Department of Veterans Affairs. Texts were delivered during typical business hours for 12 weeks, following the style of messages delivered in a study by Arora et al. (2018). The veterans received three short text messages weekly that included information about medication adherence and educational tips. The content of the messages was adapted from the wording, topics, and guidelines from the Association of

Diabetes Care and Education Specialists (ADCES). Patients received a link to open and retrieve a specific ADCES handout of a self-care behavior topic (see Appendix B). In a previous study, Nepper et al. (2019) found this method successful. The messages were selected at random from each of the ADCES categories. The ADCES granted permission for the project lead to distribute the educational tool handouts if the logo was maintained (see Appendix C).

Participants could elect to withdraw from the text messages and, therefore, the QI project, at any time, by interacting with Annie via the Annie app and choosing to stop receiving messages or by contacting the DNP lead so that they could be removed. The Annie app is available to veterans with a phone that can send and receive text messages. This service is free to all veterans, but plan charges may be incurred (and may have been occurred in the present study) for messages received based on the cellphone carrier (U.S. Department of Veterans Affairs, n.d.-a). Follow-up visits were scheduled according to the participants' chronic care regimens. After the 12 weeks, participants returned to the office for their follow-up visits to have their blood drawn for HbA1c levels per usual care with their providers. The participants then completed a postintervention SDSCA questionnaire, provided to participants by the DNP lead at the time of the appointment. The postintervention SDSCA questionnaire was the same 11-item survey completed initially and took approximately 15 min to complete.

Intervention

After obtaining support from the VA to carry out the DNP QI project, institutional review board (IRB) approval from Jacksonville University (JU) and the NF/SGVHS Evidence-Based Practice (EBP) council was completed. The DNP lead met with the stakeholders of the geriatric clinic of the VA outpatient clinic to gain their buy-in and subsequently obtained a without compensation appointment per the VA for the geriatric clinic and student access to the VA EHR.

Following IRB approval and EBP council approval, the DNP lead met with a registered nurse in the geriatric clinic for the NF/SGVHS to provide an overview of the project, its aims, and the significance of self-care behavior in patients with Type 2 diabetes. The chronic care regimen nurse in the geriatric clinic provided the DNP lead with a list of all geriatric veterans with upcoming appointments for chronic care management. Using the list provided by the local site, the DNP lead met with participants on site to explain the project, screen, and obtain consent during their appointment. The DNP lead also posted a recruitment flyer in the clinic so that any veterans who wanted to be included had the opportunity to see the flyer on site (see Appendix D). Interested participants could complete the informed consent (see Appendix E) and the SDSCA questionnaire in the clinic during their upcoming chronic care appointment (see Appendix F).

The DNP lead enrolled the participants in the Annie application after informed consents were obtained. Completed consent forms and questionnaires were scanned and uploaded by the DNP lead to secure cloud storage. Participants' HbA1c baseline data were collected from the EHR. The HbA1c baseline data obtained for all participants were a current value, reflecting a level obtained within the past 2–3 months. Once all project consents, demographic variable profiles, SDSCA scores, and HbA1c results were obtained, the data were coded and organized into a spreadsheet. No patient identifiers were included.

The veteran patients who agreed to participate in the QI project received regular diabetes management according to their chronic care regimen outlined by the outpatient VA clinic and automated text messages for 12 weeks. The patients received text messages three times weekly during the hours of a typical workday for 3 months. Participants had the opportunity to withdraw from the text messages and, therefore, this QI project, at any time, by interacting with Annie via

the Annie app and choosing to stop receiving text messages, or they could contact the DNP lead and be removed from participating in the QI project.

The VA adopted the Annie app to help providers communicate with patients outside of routine office visits and to help promote quality outcomes. The Annie mobile application is a SMS text messaging app that promotes self-care for veterans enrolled in VA health care. Patients using Annie receive automated prompts to monitor their health and receive motivational/educational messages. Clinicians can use Annie and create care protocols specific to their patient populations. Messages and patient data are stored in the Annie system, where clinicians can view the texts and readings as needed (U.S. Department of Veterans Affairs, n.d.-b). Annie is linked to the VA's EHR system. Thousands of veterans successfully use Annie to stay healthy and on track in meeting their wellness goals (Yakovchenko et al., 2019). This application is available to those with a phone that can send and receive text messages. This service is free to all veterans, but plan charges may be incurred for messages received based on the cellphone carrier (U.S. Department of Veterans Affairs, n.d.-a, n.d.-b).

For this DNP project, Annie registration occurred at the patient's chronic care appointment. The follow-up visit was scheduled according to the patient's chronic care regimen. After the 12 weeks had passed, participants returned to the office for their follow-up visits to have their blood drawn for HbA1c levels and then completed a follow-up SDSCA questionnaire at the same time of the appointment. The DNP lead then uploaded the questionnaire and HbA1c levels to the secure cloud server at the NF/SGVHS with a unique identifier that corresponded with the original ID number provided for the de-identified data.

Study of the Intervention

Glycemic control, as evidenced by HbA1c, and self-care behaviors of participants who used text messages to enhance their understanding of disease management over 12 weeks were assessed in this QI project. Table 1 shows conceptual and operational definitions for the independent variable (text messages) and the dependent variable (HbA1c and self-care behavior) for this doctoral QI project. The same messages were used for each participant. While tailored text messages may be unique to the patient, the literature did not support individualized messages being more beneficial than general messages (Peimani et al., 2016). Tailored messages can increase threats to the reliability of text messages. The data were reliable as they were collected from the same EHR for each participant before and after the intervention. The tool used to assess the measurement of self-care behavior knowledge was the SDSCA questionnaire. The SDSCA is a concise, reliable, and valid self-report survey used to gauge diabetes self-management in either a study or clinical setting (Oregon Research Institute, n.d.). When appropriate, the survey is recommended to be included in efforts exploring diabetes self-management. The complete SDSCA questionnaire is included as Appendix F. Comparing preintervention with postintervention SDSCA scores provided knowledge about self-care behavior change after the intervention.

Measures

HbA1c is a biomarker to evaluate glycemic control. The SDSCA instrument was used to evaluate self-care behavior before and after the intervention.

Hemoglobin A1c

HbA1c levels are a recommended standard of care practice for diagnosing patients with diabetes mellitus (American Association of Clinical Endocrinologists, 2015; ADA, n.d.-a; U.S.

Department of Veterans Affairs, 2017). These levels also consistently indicate chronic hyperglycemia, reflecting the average blood glucose during the last 2–3 months (Mayo Clinic, n.d.). Using this measurement in diabetes diagnosis reflects the linear relationship between HbA1c values and microvascular complications (U.S. Department of Veterans Affairs, 2017). Unlike an HbA1c level, fasting blood sugar measures glucose concentration present in the blood only at a given point of time (Sherwani et al., 2016). Thus, fasting blood glucose was an inappropriate measure for this DNP QI project

Summary of the Diabetes Self-Care Activities Assessment (SDSCA)

The SDSCA questionnaire is a concise yet valid and reliable self-report questionnaire tool for patients practicing diabetes self-management activities (Toobert et al., 2000). The SDSCA questionnaire was developed by Oregon Research Institute senior scientists Deborah Toobert and Sarah Hampson and by Russell E. Glasgow at the University of Colorado School of Medicine. The tool provides clinicians a concise self-report survey to assess diabetes self-management. The focal points of the questionnaire are general diet, diabetes-specific diet, physical activity, blood glucose testing, foot care, and smoking. This tool measures the absolute frequency of diabetes-related self-care behaviors. An example of an item measured on this questionnaire is the number of days in a week respondents engaged in physical activity or ate five or more servings of fruits and vegetables. The National Institutes of Health backed the research for the SDSCA from 1983–2009. The validation sets for the questionnaire included one with three studies from 1994 and another with seven studies in 2000. In 2000, an article in *Diabetes Care* with the most up-to-date version of the SDSCA provided normative data, interitem and test–retest reliability, correlations between the SDSCA subscales and a range of criterion measures, and sensitivity to change from seven different studies (Oregon Research

Institute, n.d.). Permission to use the SDSCA questionnaire was obtained from Deborah Toobert (see Appendix C).

Key stakeholders in this project included the patients who participated in this QI project. The results of the QI project contributed to existing knowledge about the self-care of patients with Type 2 diabetes. The directors of the local clinic were critical stakeholders as the results of the QI project reflected the behavior of clinic patients. The VA clinic providers (physician or nurse practitioner) at this agency were vital stakeholders because they manage the care and treatment of patients involved in the QI project. Lastly, the point of contact at the local clinic for the Annie app was a key stakeholder.

Project Timeline

Phase 1: Planning

- Reviewed EBP I and II papers for preparation of project and compiled existing project literature and identify gaps.
- Met with stakeholders to verbally discuss the QI project.
- Reviewed existing data on text message interventions for diabetes self-management.
- Updated and completed literature review and decided on framework to integrate.
- Contacted Deborah Toobert, author of the SDSCA tool, for permission to use the tool.
- Contacted ADCES for permission to use education handouts.
- Developed and wrote the project proposal.
- Consulted with the statistician about the most appropriate data analysis methods.
- Submitted DNP proposal to Dr. Kott, faculty chair, for review.
- Upon approval of the DNP project, submitted the proposal to IRB.
- Upon JU IRB approval, submitted to VA EBP council

Phase 2: Implementation

- Enrolled older veterans in the Annie application if not previously registered at scheduled chronic care regimen appointments.
- Administered the preintervention SDSCA questionnaire during scheduled chronic care regimen appointments.
- Collected preintervention HbA1c tests during scheduled chronic care regimen appointments.
- Implemented the educational/motivational message through the VA Annie application three times a week for 12 weeks.
- Administered the postintervention SDSCA questionnaire during follow-up chronic care regimen visits.
- Collected the postintervention HbA1c tests during follow-up chronic care regimen visits.

Phase 3: Evaluation

- Evaluated both the pre- and postintervention SDSCA questionnaires and HbA1c data.
- Consulted with the biostatistics consultant to complete the statistical analysis and interpret data.
- Wrote the findings, recommendations, and implications of the QI project.
- Presented an oral PowerPoint presentation to key stakeholders at the outpatient VA clinic and JU.
- Completed the DNP portfolio.
- Submitted final project results in the form of a manuscript to a peer-reviewed journal.
- Submitted final DNP scholarly paper to the Virginia Henderson e-repository.
- Submitted final DNP scholarly paper to the JU repository.

Data Analysis

Statistical software, JMP PRO 16.2, was used for data analysis. All QI project variables were analyzed with descriptive statistics. Analysis of the participant's characteristics included median, mode, range, standard deviation, and percent. Table 2 is an overview of the demographic variables for this project.

Table 2

Demographic Variables

Variable	Level of measurement	Rationale for inclusion as demographic variable	Descriptive statistical procedure
Gender	Nominal	Essential information to generalize the population	Frequency, percent, mode
Age	Interval	Essential information to generalize the population	Frequency, percent, mode, median, range, mean, standard deviation
Education level	Ordinal	Is there a relationship between education level and hemoglobin A1C (HbA1c)?	Frequency, percent, mode, median, mean
Socioeconomic status	Nominal	Is there a relationship between socioeconomic status and HbA1c?	Frequency, percent, mode
Length of diagnosis	Interval	Is there a relationship between the length of diagnosis and HbA1c?	Frequency, percent, mode, median, range, mean, standard deviation
Comorbidities	Interval	Is there a relationship between the length of a number of comorbidities and HbA1c?	Frequency, percent, mode, median, range, mean, standard deviation

After consultation with a biostatistics consultant, it was determined that paired *t* tests be used to evaluate the question, Is there a statistically significant difference in baseline HbA1c and postintervention HbA1c after self-management text messages? The statistical analysis plan for the SDSCA included paired *t* tests based on normality of the data. The null hypothesis was that

there is no statistically significant difference in baseline variables and postintervention variables after unidirectional self-management text messages. The alternative hypothesis was that there is a statistically significant difference in baseline variables and postintervention variables after unidirectional self-management text messages. To conclude statistical significance, 0.05 was the alpha. Table 3 is an overview of the project's dependent variables.

Table 3

Dependent Variables

Variable	Level of measurement	Descriptive statistics	Statistical test
Hemoglobin A1C	Continuous	Frequency, percent, mode, median, range, mean, standard deviation	Paired *t* test
Diabetes self-care questionnaire score	Continuous	Frequency, mean, median, quantiles, standard deviations	Paired *t* test

At the start of the project, data collection included baseline HbA1c levels, baseline SDSCA scores, and demographic variables. The biospecimen HbA1cs and demographics were obtained from the EHR. Questionnaire data were obtained from the patients. After data were obtained from the EHR and questionnaires by the DNP lead, participants were assigned ID numbers, and a master list of participants was created. Recorded data were stored on, and transmitted through, secured cloud storage. Access was granted to the project manager, trained project staff, and biostatistics consultant when the cloud storage was actively used during the QI project. Data records were password protected. Data handling was guided by the Health Insurance Portability and Accountability Act of 1996 (HIPAA).

Ethical Considerations

Before implementing this doctoral project, approval from JU's IRB and the VA's EBP Council was obtained to ensure the protection of QI project participants. Eligible patients at the NF/SGVHS outpatient clinic, identified by the DNP lead, were provided an opportunity to make an informed decision regarding their participation. The DNP lead provided answers to inquiries concerning participation before the participants completed the informed consent during their chronic care regimen appointments. The informed consent detailed the QI project and was administered by the DNP lead along with the SDSCA questionnaire. Appendix E is the informed consent the patients received. Participants were provided contact information for questions about the project, and they received a copy of their signed consent. As data were obtained, fidelity and confidentially were upheld. Participants were assured of their privacy and confidentiality of participation in this QI project.

Data recorded from the lab tests and EHRs were assigned an ID number, and a master list of participants was created (see Appendix G). Data were recorded on an Excel spreadsheet. Data collected were stored in the secure database at the local organization with a protected password and encrypted server. The handling of data was guided by HIPAA, which protects participant privacy and health information, including the electronic data and the other information collected for the present project. The NF/SGVHS computer system is secure and HIPAA compliant. Recorded data from the lab test were stored on and transmitted through secure cloud storage, JU's One Drive, so that the DNP Lead, JU faculty DNP chair, and the JU statistician could access the data through a shared secure folder protected by password and the university's firewall. All paper documents were shredded immediately after the data were transferred from the paper documents into the Excel spreadsheet or to the cloud storage. Completed paper consent forms and paper questionnaires were scanned and uploaded by the DNP lead to the NF/SGVHS

server and then to the secured cloud storage. The master list of participants and any paper documents that could not be shredded were kept in a locked cabinet in an office space provided to the DNP lead by the NF/SGVHS mentor. Documents were kept in a locked cabinet, on the server, and on One Drive through the completion of the project. No data were kept for use in future research or other purposes. Participant names and other information that can directly identify them were deleted from the data collected as part of the project.

Being approved as a student to complete a project at the VA granted access to the VA's computerized patient record system. Being approved by the VA's EBP Council allowed project completion through the necessary measures described by the DNP lead.

The chart review was purposeful, rather than random, at the NF/SGVHS outpatient clinic. The DNP lead reviewed only charts of veteran participants in the geriatric PACT (patient-aligned care team) clinic with diabetes. The number of charts was insubstantial, totaling at 10, when compared to the NF/SGVHS in its entirety.

The Annie app is available to individuals with phones that can send and receive text messages. Participants had to consent to participate with Annie per Annie terms and conditions. During registration, participants selected their preference on how to interact with Annie, either Annie via SMS or the Annie app. Annie can be accessed using SMS or through the Annie web app on a computer or mobile device. When Annie is used to receive or send texts on a mobile phone, the text messages are not encrypted. The DNP lead explained to participants that anyone who had their phones would be able to read the text messages. While no identifiable or sensitive data were sent to or received by participants, they were made aware that this preference is not secure, thus a breach of confidentiality could occur. Some risks included risk of a third party

(makers of the app, other installed apps, or other users of the device and any other outside actors) intercepting messages sent to participants.

The DNP lead informed participants that text message rates may apply. The Annie app accesses participants' personal information from the VA EHR. When the Annie app for veterans is used, participants log into Annie using a Department of Defense Self Service Logon Level 2 (Premium), ID.me, or My HealtheVet Premium Account credentials, and the messages are secure.

All messages and patient data are stored in the Annie system, where clinicians can view the texts and readings as needed (U.S. Department of Veterans Affairs, n.d.-b). Annie is linked to the VA EHR. All participants in the present study opted to use Annie with the SMS rather than the online Annie app.

Results

The primary goal of this QI project was to implement evidence-based diabetes self-management in older adult veterans diagnosed with Type 2 diabetes through text messages, sent through the VA application Annie, to determine if this education would improve self-management behaviors and reduce veterans' HbA1c levels within 90 days. In this QI project, the participants' diabetes self-management education (including diet, physical activity, self-blood sugar monitoring, and foot care) was provided via the VA Annie app, and diabetes self-management adherence was examined. Additionally, participants' HbA1c levels were reviewed before and after program education. The QI goals were to determine if implementing diabetes self-management education sent via text message (including diet, physical activity, blood glucose testing, and foot care) increased participants' diabetes self-care management by

reviewing SCSDA scores and to evaluate whether implementing diabetes self-management education via text message had a positive impact on participant's HbA1c levels.

The relationship between diabetes self-management education and adherence to diabetes self-care was assessed by comparing the preintervention and postintervention SDSCA scores over 3 months to determine if a statistically significant change in SDSCA scores had occurred. The preintervention SDSCA questionnaire was distributed and completed by veterans at their chronic care regimen appointments prior to the first diabetes self-management education text message. The postintervention SDSCA questionnaire was distributed at the participants' 3-month follow-up chronic care regimen appointments 90 days later.

The relationship between diabetes self-management education and the veterans' blood glucose levels was determined by the pre- and postintervention HbA1c values to evaluate if a statistically significant change in HbA1c had occurred. The preintervention HbA1c was a baseline value, reflecting a level obtained within the previous 2–3 months, collected from the EHR, and the postintervention HbA1c was performed during the participant's follow-up chronic care appointment.

Demographics

There were 10 total participants in this QI project. All participants were between ages 72 and 94 years, with a mean age of 79.7 and a median age of 78.5 (*SD* = 6.34). There were two women and eight men. Education levels and ethnicities were not reported. A majority (60%) of participants were classified as disabled veterans with 50% or more having service-connected disabilities. The remaining participants were veterans without service-connected disabilities. The length of time participants had been diagnosed with Type 2 diabetes was between 11 and 26 years, with a mean of 19.5 and a median of 18.5 (*SD* = 5.5).

Data showed that the participants had a variety of comorbidities, including both macrovascular and microvascular complications of diabetes. About 70% of the cohort had hypertension, and 90% had hyperlipidemia. Half of the participants had a history of either diabetic neuropathy, nephropathy, or retinopathy, and 20% of participants had cardiomyopathy. Other common comorbidities among this cohort included obesity, gout, congestive heart failure, osteoarthritis, coronary artery disease, chronic kidney disease, gastroesophageal reflux disease, obstructive sleep apnea, benign prostatic hypertrophy, and glaucoma. Two participants withdrew from the study due to reasons not disclosed: leaving the remaining number in the cohort at eight veterans.

Goal 1

The first goal was to determine if implementing diabetes self-management education sent via text message (including diet, physical activity, blood glucose testing, and foot care) improved participants' diabetes self-care behaviors. The group for which the pre- and postimplementation SDSCA questionnaire was completed and compared consisted of eight veterans. The pre- and post-implementation values for the SDSCA are summarized in Table 4. A paired *t* test was used to test the difference between pre- and postintervention self-care activities and statistically significant rates in pre- and postintervention self-care behaviors. Each self-management subcategory was analyzed separately as opposed to looking at an overall adherence rate or multiple behavioral level score. The different diabetes self-care behaviors are rather independent of one another; the extent to which a patient complies with one component of the treatment regimen, such as diet, provides little information on how compliant the patient is with a different component. As per the author's instruction on scoring the SDSCA, level of self-care is seen as a continual measure rather than a measure with defined criterion (Oregon Research Institute, n.d.).

Table 4

*Pre- and Postintervention Variables Measured with the Summary of Diabetes Self-Care Activities Questionnaire (*N = *8)*

Variable	Preintervention	Postintervention	*MD*
General diet	5.3125	5.375	0.0625
Specific diet	3.875	3.9375	0.0625
Exercise	4.3125	4.25	–0.0625
Blood glucose testing	4.375	3.6875	–0.6875
Foot care	3.1875	5.4375	2.25
Smoking	–[a]	–	–

Note. [a]No participants were smokers, so data were not gathered on this measure.

The results showed improvement in how many days a week participants adhered to general healthy diet. The difference between the pre- and postintervention scores of 0.0625 was not statistically significant, with a significance level at 5%. When comparing pre- and postintervention specific diet scores, the difference was 0.0625 as well, which indicated an improvement on how many days a week participants followed a specific diet; however, it was not statistically significant. The subcategory exercise score was also not statistically significant with a difference of –0.0625; the difference did not show improvement in how many days a week participants exercised. When assessed blood glucose testing, the findings showed a –0.6875 difference, indicating no improvement and no statistically significant changes. The number of days participants participated in foot care increased from 3.1875 to 5.4375 a week, making the difference 2.25. This difference was statistically significant, with the significance level at 5%. These findings indicated that using Annie to send diabetes self-management education did have a positive impact on certain behaviors; however, a few behaviors saw

statistically significant impacts, thus meeting the first goal. As none of the participants were smokers, no data were compared for that section of the SDSCA.

Goal 2

The second goal was to determine if implementing diabetes self-management education sent via text message (including diet, physical activity, blood glucose testing, and foot care) improved participants' HbA1c levels. The group for which the pre- and postimplementation SDSCA questionnaire was completed and compared consisted of eight veterans. A paired *t* test was used to test the difference between pre- and postintervention levels and statistically significant rates in pre- and postintervention HbA1c levels. The difference between pre- and postintervention values (9.125 and 8.55, respectively) was –0.575 points, which was not statistically significant with a significance level at 5%. This finding indicated that using Annie did not have an impact on the participants' HbA1c levels; thus, Goal 2 was not met.

Primary Project Aim

The primary project aim was to determine the effectiveness of Annie on self-management and HbA1c levels in older adult veterans. Implementing this QI project demonstrated clinically significant changes in only some self-management behaviors, such as a healthier diet and foot care, with statistical significance only being seen in foot care self-care activity. Although no statistically significant changes were observed in HbA1c points for this QI cohort, some clinically significant reductions were seen when comparing the mean pre- and postintervention HbA1cs. Overall, the results of this QI suggest that continued implementation of Annie in the older adult population could improve their Type 2 diabetes self-management and reduce HbA1c levels.

Facilitators and Limitations

Facilitators. The key facilitator in this QI project was using Annie to deliver self-management education and motivational messages to veterans. As per the literature, implementing mHealth interventions could help to close the gap between the geriatric population and treatment and support frontline assessment and access to care. Facilitators of this QI project included its QI model. Other facilitators included Lewin's three-step change theory, which supported the project as it aided in the transition from the usual diabetes chronic care regimen provided by the VA to implementing an automated text messaging diabetes educational program. The HBM supported this QI as well as its various components assisted with employing effective interventions to promote patient well-being.

Limitations. One overt limitation in this QI project was the small sample size. Approximately 50 participants were sought at the local site. However, due to lack of interest, inability to meet inclusion criterion, and attrition due to other reasons not disclosed, the available sample was small. Another barrier was the self-report questionnaire. The pre- and postintervention scores were based solely on self-report, and the SDSCA tool does not account for any bias in reported values. Consequently, the accuracy and validity of the scores obtained could be skewed by bias.

The short duration of this QI project could also be seen as a barrier when assessing HbA1c values as well as the lack of clinical background when reporting the HbA1c values. HbA1c values that increased indicated poor glucose management, but not which factor or patient behavior that contributed to it, such as illness, inadequate prescription, incompatible self-management actions, comorbid conditions, or idiosyncratic factors (Oregon Research Institute, n.d.). The same can be acknowledged when looking at looking at reductions. It can be assumed

that improved self-management behaviors were the reason behind reductions; however, added prescriptions could be a part of the reason for the reductions. Recommendations for future projects include a larger sample size, longer project duration, and considering possible changes in participants' pharmacotherapy regimens.

Sustainability and Implications

Sustainability of continued use of text messages to improve self-management of Type 2 DM primarily relies on results disseminated to the key stakeholders of the project and their buy-in. The outpatient clinic was agreeable to rolling out this doctoral QI project. The veterans had familiarity with their cellular devices, thus allowing them to participate. Also, the support of the NF/SGVHS point of contact was essential to ensure that texts could be sent to the participants with a link to the patient portal to receive the educational messages. Implementing text messaging did not require additional costs for the patients because they already had mobile devices, and the messages were delivered from the VA's automated system. Annie is a free service to all participating veterans, and no additional charges were incurred in using this app. Obtaining the follow-up HbA1c levels for data collection did not add additional cost to patients, as the follow-up appointments were part of their standard care. Introducing the project to the participants and project staff required a minimal amount of time. Appendix H provides an outline of the project's financials.

The results of this QI project have practical implications for providers who participate in the chronic care regimen for older adult veterans, as diabetes is a prevalent chronic condition among older veterans. Favorable results, as evidenced by decreases in HbA1c levels and improved self-report of diabetes self-care activities, produced quality health care outcomes.

Automated text messages delivered to veterans through the VA's Annie application can be incorporated into veterans' chronic care regimens.

Dissemination

Sharing the acquired knowledge from implementing automated text messages to improve diabetes self-management in older veterans in an outpatient VA clinic setting added to the available nursing knowledge. Specifically, the results of the doctoral QI project impacted the overall management of Type 2 diabetes locally and perhaps can impact veterans nationally through the VA. Improving self-management of Type 2 diabetes improved participants' HbA1c levels and helped to reduce their risk of secondary complications, thus increasing their quality of life.

Now that this doctoral project is complete, the DNP lead plans to disseminate and publish the QI project results to target populations and audiences. Dissemination includes presenting the results to the local outpatient VA clinic administrative personnel, VA providers who manage diabetes care and chronic conditions, and other stakeholders who implement automated text message self-care reminders to older veterans. The DNP lead prepared and presented a PowerPoint presentation of the project findings for the DNP final defense to an audience of faculty at JU. The final manuscript will be prepared and sent to applicable journals agreeable to publishing the findings from the doctoral QI project. The Sigma and JU e-repositories received a submission of the final doctoral QI project.

Project Funding

Funding for this QI project was supported by the DNP lead. The only cost associated with this project was $25, incurred from seeking permission to use the SDSCA questionnaire. Printing materials including consent forms, a recruitment flyer, and questionnaire forms were of no

charge to the DNP lead as these materials were readily available to the DNP lead. Costs associated with travel to the local VA clinic were covered by the DNP lead. The Annie app is free provided by the VA to veterans and clinicians, and Annie was incorporated into the participants usual chronic care regimen. The 3-month postintervention HbA1c collection was not an additional cost to the participants as it is a biomarker obtained as a part of the participants' standard care/chronic care regimen.

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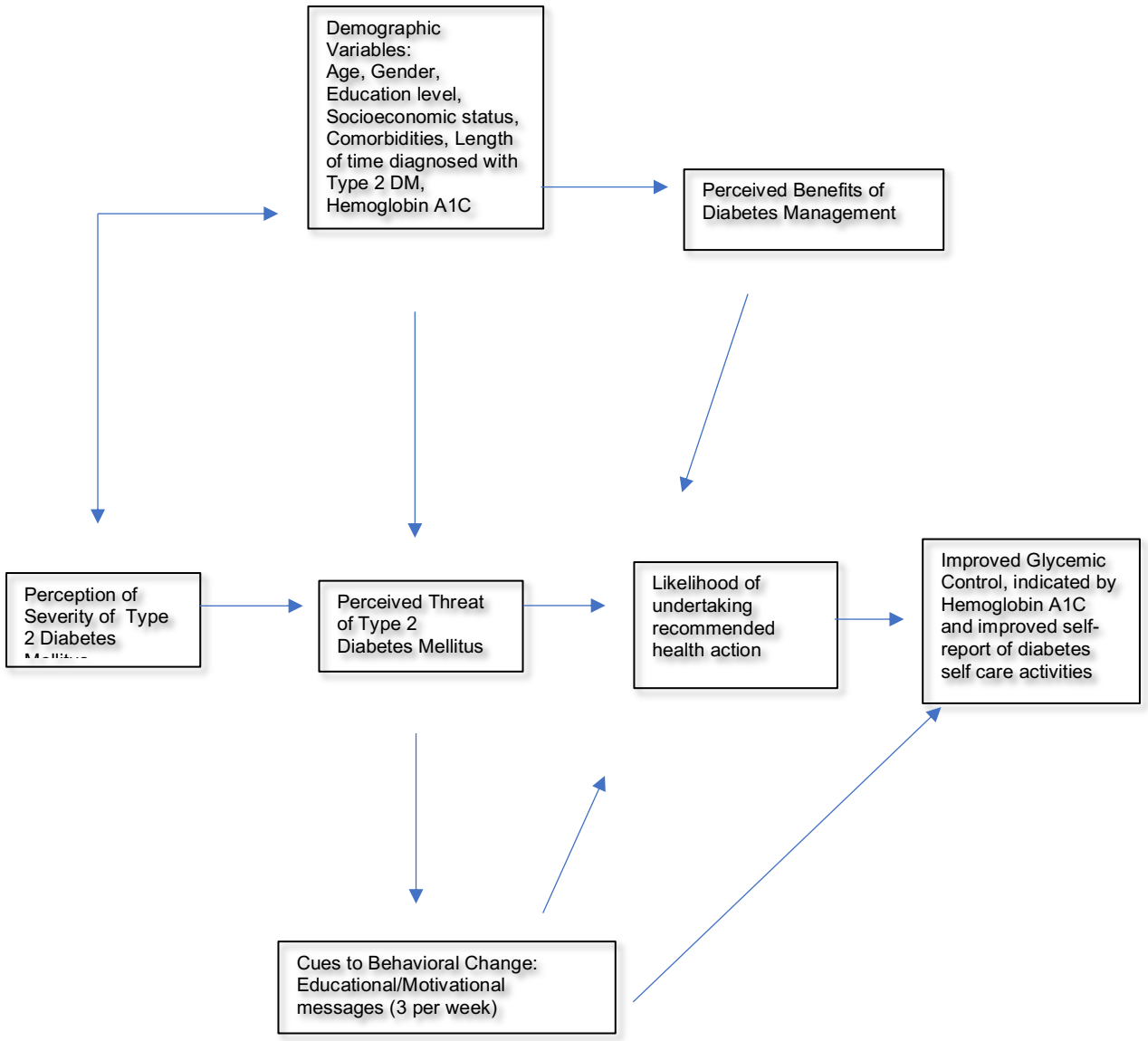
Appendix A

Figure 1

Health Belief Model with a Diabetes Self-Management Support



Appendix B

Permission to use AADE7 Education Tool

AADE7 Self-Care Behaviors for Managing Diabetes Effectively

ADCES

Find an Education Program | ADCES Connect | Online Store | ADCES21 | About ADCES | JOIN ADCES

danatech | Practice | Prevention | Education | Living with Diabetes | Advocacy | Research | News | Sign In

Reducing Risks

Having diabetes puts you at a higher risk for developing other health problems. However, if you understand the risks, you can take steps now to lower your chance of diabetes-related complications.

Read More

© 2020 Association of Diabetes Care & Education Specialists. You may print and distribute the handouts, but the ADCES logo must be maintained on all copies.

Appendix C

Permission to use the SDSCA Questionnaire in doctoral QI project

Permission to use the Summary of Diabetes Self-Care Activities Questionnaire in your research

Deborah Toobert [redacted]
Thu 10/1/2020 4:21 PM
To: Brunson, Danielle [redacted]

3 attachments (148 KB)
SDSC-7studies-measure-rev with number of citations.pdf; Summary of Diabetes Self-CareAlternateFormatting.docx; Summary of Diabetes Self-DiabetesCare2000.docx;

CAUTION: This email originated from outside of Jacksonville University. DO NOT click links or open attachments unless you recognize the sender and are expecting the information or have verified via other means that the sender and content is safe.

Dear Danielle,

Thank you for your payment of $25 for permission to use the Summary of Diabetes Self-Care Activities Questionnaire (SDSCA) in your study. Now that we have received your payment, you have our permission to use the English version of the Summary of Diabetes Self-Care Activities Questionnaire in your research project and we will be able to provide answers to any questions you may have. We have attached the 2000 Diabetes Care article with the SDSCA psychometric information. At the end of the article, there is an appendix with the English version of the questionnaire, and the scoring information. We have also attached a user-friendly copy of the English version of the SDSCA instrument.

If you need a translation of the SDSCA please contact me first, as the SDSCA has been translated into many languages. There will be no further charge.

Please be sure to check our website first for the most frequently asked questions:

http://www.ori.org/sdsca

We wish you every success with your research,
Deborah

Deborah J. Toobert, PhD
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Oregon Research Institute
1776 Millrace Drive
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[redacted]

Appendix D

Summary of Diabetes Self-Care Activities Questionnaire

The questions below ask you about your diabetes self-care activities during the past 7 days. If you were sick during the past 7 days, please think back to the last 7 days that you were not sick.

Diet

	Number of Days
1. How many of the last SEVEN DAYS have you followed a healthful eating plan?	□0□1□2□3□4□5□6□7
2. On average, over the past month, how many DAYS PER WEEK have you followed your eating plan?	□0□1□2□3□4□5□6□7
3. On how many of the last SEVEN DAYS did you eat five or more servings of fruits and vegetables?	□0□1□2□3□4□5□6□7
4. On how many of the last SEVEN DAYS did you eat high-fat foods, such as red meat or full-fat dairy products?	□0□1□2□3□4□5□6□7

Physical Activity

5. On how many of the last SEVEN DAYS did you participate in at least 30 minutes of physical activity? *(Total minutes of continuous activity, including walking).*	□0□1□2□3□4□5□6□7
6. On how many of the last SEVEN DAYS did you participate in a specific exercise session (such as swimming, walking, biking) other than what you do around the house or as part of your work?	□0□1□2□3□4□5□6□7

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Blood Sugar Testing

	Number of Days
7. On how many of the last SEVEN DAYS did you test your blood sugar?	□0□1□2□3□4□5□6□7
8. On how many of the last SEVEN DAYS did you test your blood sugar the number of times recommended by your health-care provider?	□0□1□2□3□4□5□6□7

Foot Care

9. On how many of the last SEVEN DAYS did you check your feet?	□0□1□2□3□4□5□6□7
10. On how many of the last SEVEN DAYS did you inspect the inside of your shoes?	□0□1□2□3□4□5□6□7

Smoking

11. Have you smoked a cigarette, even a puff, in the past SEVEN DAYS? ☐0 No ☐1 Yes ≡ 11a. How many cigarettes did you smoke on an average day?

Number of cigarettes:

_____

Scoring Instructions for the Summary of Diabetes Self-Care Activities

Scores are calculated for each of the five regimen areas assessed by the SDSCA: Diet, Exercise, Blood-Glucose Testing, Foot Care, and Smoking Status.

Step 1
For items 1–10, use the number of days per week on a scale of 0–7. Note that this response scale will not allow for direct comparison with the percentages provided in Table 1.

Step 2: Scoring Scales

General Diet = Mean number of days for items 1 and 2.

Specific Diet = Mean number of days for items 3 and 4, reversing item 4 (0=7, 1=6, 2=5, 3=4, 4=3, 5=2, 6=1, 7=0). Given the low inter-item correlations for this scale, using the individual items is recommended.

Exercise = Mean number of days for items 5 and 6.

Blood-Glucose Testing = Mean number of days for items 7 and 8.

Foot Care = Mean number of days for items 9 and 10.

Smoking Status = Item 11 (0 = nonsmoker, 1 = smoker) and number of cigarettes smoked per day.

Appendix E

Office of Research
& Sponsored Programs
JACKSONVILLE UNIVERSITY

INSTITUTIONAL REVIEW BOARD (IRB):

INFORMED ADULT CONSENT Quality Improvement

Please Read and Sign

Jacksonville University takes the safety of our quality improvement project participants very seriously. We need to provide you with important information about the coronavirus, which is also called COVID-19. It is a virus that can be spread from person to person. We need to tell you about ways your participation in this study might change because of the risks caused by the coronavirus.

If you are considering joining this quality improvement project, it is important that you consider the following information to determine if study participation is right for you at this time.

How is COVID-19 spread? COVID-19 is a respiratory virus that can be spread through small droplets that come from us as we breathe. This can happen between people who are in close contact with one another (less than 6 feet). It is also possible that a person can get COVID-19 by touching a surface or object (such as a doorknob or counter surface) that has the virus on it, then touching their mouth, nose or eyes.

Can COVID-19 be prevented? Current ways to minimize the risk of exposure to COVID-19 include "social distancing" which is a practice to decrease the potential for direct exposure to others who may have been exposed to COVID-19, for example by avoiding large gatherings or refraining from shaking hands with others. It is important to understand that since your participation may include increased travel outside of your home and increased exposure to others within a clinical care environment or research site (e.g., dance studio, JU Campus) that your possible exposure to COVID-19 may increase.

What are the risks of COVID-19? For most people, the coronavirus causes only mild or moderate symptoms, such as fever and cough. For some, especially older adults and people with existing health problems, it can cause more severe illness, including pneumonia. While we are still learning about this virus, the information we have right now suggests that about 3 out of 100 people who are infected might die from the virus.

Who is most at risk? Individuals over 60 and those with chronic conditions such as cancer, diabetes, and lung disease have the highest rates of developing serious complications from the virus.

How could your participation in this quality improvement project change as a result of COVID-19? There are several ways for us to try to lower your risk of exposure.

- The project lead may limit the number of times you come to a clinical care or research/project site, as for example, the JU Campus, an offsite clinic, or dance studio. Please know that by coming to a project site, you are assuming the risk of exposure to the coronavirus (or other public health risks). This risk may increase if you travel by public transportation, cab, or ridesharing service.

- Do not come to the JU campus or a research/project site if you or someone in your household has tested positive for COVID-19 in the past 14 days, or if you are exhibiting symptoms of illness such as fever, cough or shortness of breath.
- For JU research/project sites, before coming to campus, visitors must review a medical disclosure statement (see below) acknowledging that they have followed a series of steps to check their health and that they will comply with University policies, including bringing a mask to wear on campus.

Those unwilling to comply with policies regarding social distancing and masks will be asked to leave campus. For other research sites, e.g., dance studios, or clinics, please inquire about site specific policies.

- **JU's Medical Disclosure Statement**: Visitors with members of their household who have tested positive for COVID-19 in the past 14 days or who are exhibiting symptoms of illness such as fever, cough or shortness of breath are not permitted on campus. Please perform a self-health check and take your temperature prior to arriving on campus to ensure you are not exhibiting COVID-19 symptoms and your temperature reading is below 100.4 degrees F. ***Please note Jacksonville University reserves the right to temperature check visitors upon arrival to campus.***

- If there is a reappearance of the COVID-19 virus or if other health concerns arise, the project lead may substitute face-to-face interactions with remote contact options such as using the phone, Zoom, or other means, whenever possible.

- If a face-to-face interaction or intervention is required, the project lead may pre-screen for COVID-19 over the phone. As part of the pre-screening process, you will be asked if you have had symptoms of COVID-19 or have been in close contact with anyone who has or had COVID-19. If you have a positive risk/symptoms screening, please consult your healthcare provider, visit the Florida Department of Health COVID-19 Response website, or call center for further information.

  - Florida Department of Health COVID-19 Response Team
  - Website: https://floridahealthcovid19.gov/
  - 24/7 Call Center: (866) 779-6121
  - Email: COVID-19@flhealth.gov

- Project participants with possible exposure or symptoms of the illness may be rescheduled if medically cleared for COVID-19, excluded, or withdrawn from the study.

- The project lead may try to reduce the time you are exposed to other people/participants as much as possible. For example, the project lead may limit the number of participants at the site by providing individual appointment times.

- The project lead will use masks, gloves, face-shields, etc., to minimize your exposure. Participants will also wear masks, gloves, and clean their hands often while on the research site or the JU campus. For JU research sites, all guests and visitors must bring their own face coverings and wear them in the designated mask-required areas or when interacting with people on campus.

- If during the course of the project you are suspected to be positive for COVID-19, there may be last minute changes to how procedures are performed (such as a change from an in-person visit to a telephone call) or cancellations of research tests or procedures to ensure your safety. It is even possible that your research procedures will be put on hold or stopped because of COVID-19.

- Participants will inform the members of the research team if there is a change on their health status.

The information related to risks of COVID-19 changes every day. Jacksonville University continues to monitor the risks and make decisions about how these risks should change our research process. If you have questions about COVID-19 and your participation in this quality improvement study, please talk to your project lead.

Acknowledgements

_____I have read the COVID-19 message to project participants and have been given the opportunity to ask questions. Based on this information,

> _____I agree to participate in this project. I understand that people infected with COVID-19 may not show symptoms, but they may still be highly contagious. I understand that Jacksonville University, the project leads, and project staff will use various strategies such as social distancing to lower the spread of COVID-19 while participating in this project. However, given the nature of the virus, I understand that even with these strategies in place, there is a possibility that I can become infected with COVID-19. I assume the risk of potentially becoming infected with COVID-19 by voluntarily consenting to participate in this project.

Participant's Name: _____

Participant's Signature: _____ Date:_____

_____I do not wish to participate in the study. (Stop here, and please return this document to the researcher. Thank you for your time and consideration).

If you agree to participate, please continue with the consent process.

Project Summary

Title of the Project: Quality Improvement: Improving Type 2 Diabetes Self-Management and A1c Levels in Older Adult Veterans Using an Automated Message System

Project Lead: Danielle Brunson, BSN, RN, Jacksonville University, Phone number: Redacted for Privacy Redacted for Privacy

Faculty Advisor: Kathryn Kott, Ph.D., APRN, FNP-C, Jacksonville University, Redacted for Privacy Redacted for Privacy

You are invited to participate in a project. You must be 65 years old or older. You must be able to read and speak the English, have a cell phone that can receive and send text messages, and be comfortable texting, and have a hemoglobin A1C level above 8%. Taking part in this project is voluntary. Whether or not you decide to participate in this study, you will receive your standard care.

The purpose of this project is to improve your self-care activities of your Type 2 Diabetes by sending you text messages with diabetes education for 3 months. These messages may help improve your diabetes control and improve diabetes self-care activities.

If you agree to take part in this project, you will receive regular diabetes care outlined by your health care provider at the veterans health system outpatient clinic. You will also be receiving text messages three times a week during the normal business hours for three months. You can choose to stop the text messages and therefore project, at any time, by texting Annie to stop receiving messages. You may also contact the project leader so that you be removed. We expect your involvement will take about three months. I will collect the following information from your electronic medical record including gender, age, education level, socioeconomic status, how long you have had type 2 diabetes, long term health conditions, and hemoglobin A1c level. At the start of the project and the end of the project, the project leader will ask that you complete a survey about your diabetes activates.

There are some risks and or discomforts you might experience from being in this project. These are breach of confidentiality. To minimize this risk, your data recorded from the lab test and electronic medical record, will be assigned an ID code number, and a master list (code list) of participants will be created for the purpose of tracking you through the project. Only the project leader will have access to the master list which will be stored separately on a HIPAA compliant server that is password protected at the local site. Data input will be recorded in an excel spreadsheet. Deidentified data collected will be stored in the secure database at the local clinic with a protected password and encrypted server. The handling of data and patient health information will be guided by Health Insurance Portability and Accountability Act (HIPAA) 1996 to protect your privacy. The clinics computer system is secure and HIPAA compliant. Recorded data from the lab test will also be stored on, and transmitted through, secure cloud storage, JU's One Drive, so that the DNP Lead, JU faculty DNP chair and the JU statistician be granted access to de-identified data through a shared secure folder protected by password and the university's firewall.

All paper documents, including your survey responses and consent forms, related to the project will be retained for three years, which after that we will shredded. All electronic files will be deleted after three years, after the data are transferred from the paper documents into the Excel spreadsheet or to the cloud storage. Completed paper consent forms and paper questionnaires will be scanned and uploaded by the project leader to the clinic's server and then to the secured cloud storage. Any paper documents, survey responses and consent forms that cannot be shredded will be kept in a locked cabinet in an office space provided to the DNP Lead by the NF/SG VHS mentor. Documents will be kept in a locked cabinet, on the server, and on One Drive through the completion of the project and for three years following the project. I will not keep data to use for future research or other purpose. The project leader will upload the survey and hemoglobin A1c levels taken after three months to the server at the local clinic and the secured cloud storage with a unique identifier that compares with the original ID number provided for the de-identified data to pair with information collected at the beginning of the project accordingly.

Annie application is available to those with a phone that can send and receive text messages. You must consent to participate with Annie per Annie terms and conditions. During registration you can select your preference on how to interact with Annie. Annie can be accessed using text messaging or through the Annie App, on a computer or mobile device.

When Annie is used to receive or send texts on a mobile phone, the text messages are not encrypted. Anyone who has your phone would be able to read the text messages. While no identifiable or sensitive data will be sent to or received by you, please be aware that this preference is not secure, thus breach of confidentiality may occur. Some risks may include risk of a third party (makers of the app, other installed apps, or other users of the device and any other outside actors) interrupting messages sent to participants. The project leader will inform participants that text message rates may apply.

The Annie App accesses your personal information from the VA Electronic Health Record. When the Annie App for Veterans is used, you must log into Annie using your Department of Defense Self Service Logon Level 2 (Premium), ID.me or My HealtheVet Premium Account credentials, and the messages are secure.

All messages and your data are stored in the Annie system, where the project leader can view the texts and readings as needed. Annie is linked to your VA health record.

You may benefit directly from being in this diabetes educational project because you will receive free diabetes self-management education. Hemoglobin A1c levels may be reduced within 90 days with diabetes education. This diabetes education may help you increase your activity level, eat healthier, monitor your blood sugar levels better and be aware of reducing risks. Following with these activities can help you better manage your Type 2 diabetes and help you experience less complications

If you decide to take part in the project, it should be because you really want to volunteer. You will not lose any services, benefits, or rights you would normally have if you chose not to volunteer. If you are a patient, nothing about your medical status or services will change no matter what you decide.

If you are interested in learning more about the project, please continue to read below. If you are not interested stop here.

Thank You.

Office of Research & Sponsored Programs
JACKSONVILLE UNIVERSITY

INSTITUTIONAL REVIEW BOARD (IRB):

INFORMED
ADULT CONSENT
Quality Improvement

READABILITY SCORE: Flesch Reading Ease Score 66.7; Flesch-Kincaid Grade level: 7.9

PARTICIPANT'S NAME (Print): _____

TITLE OF THE PROJECT: Quality Improvement: Improving Type 2 Diabetes Self-Management and A1C Levels in Older Adult Veterans Using an Automated Message System

PROJECT LEADS: Danielle Brunson, BSN, RN, Jacksonville University, Phone number: Redacted for Privacy Redacted for Privacy

Responsible Primary Lead: : Kathryn Kott, Ph.D., APRN, FNP-C, Jacksonville University, Redacted for Privacy Redacted for Privacy

PROJECT LEAD'S STATEMENT:
We are asking you to be in a scholarly project. The purpose of this consent letter is to give you the information you will need to help you decide whether to participate. Please read this form carefully. You may ask questions about the purpose of the project, the possible risks and benefits, and anything else about the project or this form that is not clear. When we have answered all your questions, you can decide if you want to be in the project or not. This process is called "informed consent." We will give you a copy of this form for your records.

THE PURPOSE OF THE PROJECT: is to improve your self-care activities of your Type 2 Diabetes by sending you text messages with diabetes education for 3 months. These messages may help improve your diabetes control and improve diabetes self-care activities

PROCEDURES: You will be asked to receive regular diabetes care outlined by your health care provider at the veterans health system outpatient clinic. You will also be receiving text messages three times a week during the normal business hours for three months. You can choose to stop the text messages and therefore project, at any time, by texting Annie to stop receiving messages. You may also contact the project leader so that you be removed. We expect your involvement will take about three months. I will collect the following information from your electronic medical record including gender, age, education level, socioeconomic status, how long you have had type 2 diabetes, long term health conditions, and hemoglobin A1c level. At the start of the project and the end of the project, the project leader will ask that you complete an 11-item survey about your diabetes activities. The survey *will take you a total of 15 minutes to complete during your scheduled appointment.* After a three month follow up you will complete the exact same 11-item survey completed initially and it will take approximately 15 minutes.

About 50 adult participants are anticipated to take part in the education project; however, the project is open to all veterans in the clinic.

If you decide to be in the project, the Project Lead will collect the following information: gender, age, education level, socioeconomic status, length of diagnosis, comorbidities, hemoglobin A1C level from your medical records at the beginning of the project and the end of the project, and Summary of Diabetes Self Care Activities questionaries at the beginning of the project and the end of the project.

In addition to the information listed above, I will be collecting private health information such as Hemoglobin A1c from your records, however, all identifiers will be removed. I will not use these de-identified data for future work or share with other investigators without additional informed consent from you.

If you have any questions now or at any time during the project, you may contact anyone listed under Project Leads.

PERSONAL HEALTH INFORMATION

Identifiable Health Information to be collected:

If you decide to be in the project, the project team will collect the following information (below are some examples of data that may be HIPAA protected):

- Age
- Gender
- Education Level
- Socioeconomic Status
- Names
- Identifiable biospecimens (Hemoglobin A1C)

How it will be used:

The project team listed above will use or share your health information as described in the procedures section above to carry out this project.

With whom will this information be shared?

This health information may be shared with:
Kathryn Kott, Ph.D., APRN, FNP-C, Project Advisor, Jacksonville University

Peter Wludyka, PhD Biostatistics Consultant, Jacksonville University

- United States governmental agencies which are responsible for overseeing research, such as the Food and Drug Administration, the Department of Health and Human Services, and the Office of Human Research Protections
- Government agencies which are responsible for overseeing public health concerns such as the Centers for Disease Control and federal, state, and local health departments
- Your insurance company for purposes of obtaining payment
- The IRB that reviewed this Research Study and ensures your rights as a project participant are protected.

Otherwise, your identifiable health information will not be shared without your permission unless required by law or a court order. Once your health information is shared with those listed above, it is possible that they could share it without your permission because it would no longer be protected by the federal privacy law.

You may not be allowed to see the project information collected about you for this project, including the project information in your medical record, until after the project is completed. When this project is over, you will be allowed to see any project related information collected and placed in your medical record.

You may also refuse to authorize the use of your health information, but if you refuse, you may not be allowed to be in this project or receive any project-related treatment that is only available in this project. However, your decision not to sign this Authorization will not affect any other treatment you may be eligible to receive.

BENEFITS OF THE PROJECT: You may benefit from being in this diabetes educational project because you will receive free diabetes self-management education. This diabetes education may help you increase your activity level,

eat healthier, monitor your blood sugar levels better and be aware of reducing risks. Through these activities you can gain better control of your diabetes. Through the education, you may improve your diabetes self-management skills and behaviors. Other benefits include the knowledge learned from the project, and reduced hemoglobin A1c levels.

We may learn information about your health as part of the project. We will share this information with you at the beginning of the project and at the conclusion during your scheduled chronic care appointments at the VA clinic.

Also, during the project, the Project Team will notify you of new information that may become available and might affect your decision to remain in the study.

Please note, participating in more than this project may further increase the risks to you. If you are already enrolled in a research study or project, please inform one of the Project members listed above or the person reviewing this consent with you before enrolling in this or any other research study or project.

No promise or guarantee of benefits has been made to encourage your participation.

RISKS OF THE PROJECT: The risks of taking part in this project are To minimize this risk, your data recorded from the lab test and electronic medical record, will be assigned an ID code number, and a master list (code list) of participants will be created for the purpose of tracking you through the project. Only the project leader will have access to the master list which will be stored separately on a HIPAA compliant server that is password protected at the local site. Data input will be recorded in an excel spreadsheet. Deidentified data collected will be stored in the secure database at the local clinic with a protected password and encrypted server. The handling of data and patient health information will be guided by Health Insurance Portability and Accountability Act (HIPAA) 1996 to protect your privacy. The clinics computer system is secure and HIPAA compliant. Recorded data from the lab test will also be stored on, and transmitted through, secure cloud storage, JU's One Drive, so that the DNP Lead, JU faculty DNP chair and the JU statistician be granted access to de-identified data through a shared secure folder protected by password and the university's firewall.

All paper documents, including your survey responses and consent forms, related to the project will be retained for three years, which after that we will shredded. All electronic files will be deleted after three years, after the data are transferred from the paper documents into the Excel spreadsheet or to the cloud storage. Completed paper consent forms and paper questionnaires will be scanned and uploaded by the project leader to the clinic's server and then to the secured cloud storage. Any paper documents, survey responses and consent forms that cannot be shredded will be kept in a locked cabinet in an office space provided to the DNP Lead by the NF/SG VHS mentor. Documents will be kept in a locked cabinet, on the server, and on One Drive through the completion of the project and for three years following the project. I will not keep data to use for future research or other purpose. The project leader will upload the survey and hemoglobin A1c levels taken after three months to the server at the local clinic and the secured cloud storage with a unique identifier that compares with the original ID number provided for the de-identified data to pair with information collected at the beginning of the project accordingly.

Annie application is available to those with a phone that can send and receive text messages. You must consent to participate with Annie per Annie terms and conditions. During registration you can select your preference on how to interact with Annie. Annie can be accessed using text messaging or through the Annie App, on a computer or mobile device.

When Annie is used to receive or send texts on a mobile phone, the text messages are not encrypted. Anyone who has your phone would be able to read the text messages. While no identifiable or sensitive data will be sent to or received by you, please be aware that this preference is not secure, thus breach of confidentiality may occur. Some risks may include risk of a third party (makers of the app, other installed apps, or other users of the device and any other outside actors) interrupting messages sent to participants. The project leader will inform participants that text message rates may apply.

The Annie App accesses your personal information from the VA Electronic Health Record. When the Annie App for Veterans is used, you must log into Annie using your Department of Defense Self Service Logon Level 2 (Premium), ID.me or My HealtheVet Premium Account credentials, and the messages are secure.

All messages and your data are stored in the Annie system, where the project leader can view the texts and readings as needed. Annie is linked to your VA health record.

IN THE CASE OF INJURY OR ADVERSE EVENT (USE IF CONDUCTING A CLINICAL TRIAL OR A PROJECT WHERE CLINICAL OR STANDARD OF CARE IS BEING EVALUATED): Please contact the Project Leads immediately, but also in the case of emergency please seek medical attention. Jacksonville University has not set aside funds for any medical costs, damages, or other financial loss from this project. The only exception is if it is proved that your injury or illness is directly caused by the negligence of a Jacksonville University employee. "Negligence" is the failure to follow a standard duty of care.

If you become ill or injured from being in this project, your insurer may be billed for your treatment costs. If you do not have insurance, or if your insurer does not pay, then you would have to pay these costs. If you believe you have become ill or injured from this project, you should contact Kathryn Kott at 309- 634-6121 (24-hour cell number). You should also let any healthcare provider who treats you know that you are in a project.

COSTS / COMPENSATION: You will not have to pay. You will not be paid to take part in this project. Your insurance will not be billed for the diabetes education provided. This project is paid for by the Project Student Lead. The diabetes education received will not replace what the local organization routinely provides. Annie is a free service to all veterans, but plan charges may incur for messages received based on your cellphone carrier.

ALTERNATIVE TO BE IN THE PROJECT: The alternative to taking part in this project is not to participate. You may choose to receive the standard education that is provided by the local organization for diabetes.

CONFIDENTIALITY: Records or data obtained as a result of your participation may be reviewed by the Project Leads and/or The Jacksonville University's Institutional Review Board. However, they are legally obligated to protect any identifiable information from public disclosure, except where disclosure is otherwise required by law. We will not share your data with other investigators. Otherwise, research records or data you provide as part of being in this project will not be released without your permission unless required by law or a court order. However, if we learn that you intend to harm yourself or others, we must report that to the authorities.

I plan to publish the results of this project. To protect your privacy, I will not include any information that may identify you. To protect your privacy, your data recorded from the lab test and electronic medical record, will be assigned an ID code number, and a master list (code list) of participants will be created for the purpose of tracking you through the project. Only the project leader will have access to the master list which will be stored separately on a HIPAA compliant server that is password protected at the local site. Data input will be recorded in an excel spreadsheet. Deidentified data collected will be stored in the secure database at the local clinic with a protected password and encrypted server. The handling of data and patient health information will be guided by Health Insurance Portability and Accountability Act (HIPAA) 1996 to protect your privacy. The clinics computer system is secure and HIPAA compliant. Recorded data from the lab test will also be stored on, and transmitted through, secure cloud storage, JU's One Drive, so that the DNP Lead, JU faculty DNP chair and the JU statistician be granted access to de-identified data through a shared secure folder protected by password and the university's firewall.

All paper documents, including your survey responses and consent forms, related to the project will be retained for three years, which after that we will shredded. All electronic files will be deleted after three years, after the data are transferred from the paper documents into the Excel spreadsheet or to the cloud storage. Completed paper consent forms and paper questionnaires will be scanned and uploaded by the project leader to the clinic's server and then to the secured cloud storage. Any paper documents, survey responses and consent forms that cannot be shredded will be kept in a locked cabinet in an office space provided to the DNP Lead by the NF/SG VHS mentor. Documents will be kept in a locked cabinet, on the server, and on One Drive through the completion of the project and for three years following the project. I will not keep data to use for future research or other purpose. The project leader will upload the survey and hemoglobin A1c levels taken after three months to the server at the local clinic and the secured cloud storage with a unique identifier that compares with the original ID number provided for the de-identified data to pair with information collected at the beginning of the project accordingly.

Annie application is available to those with a phone that can send and receive text messages. You must consent to participate with Annie per Annie terms and conditions. During registration you can select your preference on how to interact with Annie. Annie can be accessed using text messaging or through the Annie App, on a computer or mobile device.

When Annie is used to receive or send texts on a mobile phone, the text messages are not encrypted. Anyone who

has your phone would be able to read the text messages. While no identifiable or sensitive data will be sent to or received by you, please be aware that this preference is not secure, thus breach of confidentiality may occur. Some risks may include risk of a third party (makers of the app, other installed apps, or other users of the device and any other outside actors) interrupting messages sent to participants. The project leader will inform participants that text message rates may apply.

The Annie App accesses your personal information from the VA Electronic Health Record. When the Annie App for Veterans is used, you must log into Annie using your Department of Defense Self Service Logon Level 2 (Premium), ID.me or My HealtheVet Premium Account credentials, and the messages are secure.

All messages and your data are stored in the Annie system, where the project leader can view the texts and readings as needed. Annie is linked to your VA health record.

I will not keep your data to use for future research or other purpose. Your name and other information that can directly identify you will be deleted from the data collected as part of the project.

I may share your data with other investigators without asking for your consent again, but it will not contain information that could directly identify you. The findings from the education project will be used to write a paper. The paper will be sent to an electronic repository for other health care professionals to read. Other investigators, professionals, or students may use the findings in this paper for future studies.

To conduct this project, I would need access to your medical records to collect your most recent hemoglobin A1c level so that it may be compared to your future hemoglobin A1c level at the conclusion of the project. This information will be de-identified. The project lead, faculty chair, and biostatistics consultant will have access to this information. The Hemoglobin A1c level obtained at the completion of this project will be a part of your medical record. .

CONFLICT OF INTEREST: In general, presenting results helps the career of a scientist. The Project Leads may benefit if the results are presented at scientific meetings or published in scientific journals.

RIGHT TO PARTICIPATE OR WITHDRAW: You are free to stop taking part in this project at any time without penalty and without losing any benefits. You will be provided, as applicable, with any significant new findings developed during this project that may relate to your participation.

If you decide to stop taking part in this project for any reason, you should contact [Dr. Kathryn Kott (JU DNP Project Faculty Chair) at 309-634-6121. If you choose to tell the Project Lead why you are leaving, your reasons may be kept as part of the project record. If you decide to withdraw from the project, it may be impossible to exclude the data that has already been collected. No additional health information about you will be collected or disclosed to the project team. However, if you take back this authorization, you may not be able to continue in this study. Please discuss this with a member of the project team listed above.

If you have any questions regarding your rights as a project participant, you may call the JU Office of Research & Sponsored Programs at (904) 256-7151.

You may be withdrawn from the project without your consent for the following reasons: You do not meet the eligibility criteria, become pregnant, admitted to the hospital, incarcerated, or unable to keep up with exercise, healthy eating, appointments, blood glucose monitoring or performing the tasks of the study

CONSENT TO PARTICIPATE: I have been informed about this project's purpose, procedures, possible benefits, and risks; and the alternatives to being in the project. I have been given the opportunity to ask questions before I sign, and I have been told that I can ask other questions at any time. I understand that my consent does not take away any of my legal rights. I also understand that nothing in this consent form is intended to replace any applicable Federal, state, or local laws.

By signing this form, I voluntarily agree to take part in this project. I am not waiving any of my legal rights. I will receive a copy of this form. I hereby authorize the collection, use, and sharing of my protected health information as described above.

I give permission to the Project Leads to use my medical records as described in this consent form."

_____ _____

Printed Name of Person Consenting and Authorizing Signature Date

Person Obtaining Consent and Authorization:

As a project lead or the investigator/project lead's representative, I have explained to the participant the purpose, the procedures, the possible benefits, and the risks of this quality improvement project; the alternative to being in the project; and how the participant's protected health information will be collected, used, and shared with others:

_____ _____

Printed Name of Person Consenting and Authorizing Signature Date

Appendix F

Educational text messages for Veterans with T2DM	
Topic	**Content of Text Message**
Healthy Eating	*Example Messages* Eating healthy can fit all tastes and traditions while choosing a variety of nutritious foods and beverages. Develop a healthy meal plan with your healthcare team that fits your personal health needs A healthy meal includes carbohydrates, fruits, vegetables, protein/dairy, healthy fats and oils. Work with your healthcare team to learn about appropriate portion/ serving sizes and to understand Nutrition Fact Labels to avoid blood sugar spikes or drops. Be mindful of added sugars, high fat meets, foods high in saturated fats, high sodium foods and alcohol. Link: https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors/healthy-eating
Being Active	*Example Messages* Being active is an important part of staying healthy. Making physical activity part of your daily lifestyle uses up calories even if it's not part of a structured exercise plan. Being active has many health benefits such as losing weight, lowering cholesterol, improving blood pressure, lowering stress and anxiety, and improving your mood. physical activity can also help keep your blood sugar levels normal and help you keep your diabetes in control. Link:https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors/being-active
Monitoring	*Example Messages* Monitoring your blood sugar helps you know if you are meeting recommended treatment goals to keep you healthy. Monitoring your diabetes involves your overall health, such as blood pressure, weight, cholesterol levels, heart health, sleep, mood, medications, and eye, kidney and foot health. Link: https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors/aade7-self-care-behaviors-monitoring
Taking Medication	*Example Messages* Create a daily routine for taking and tracking your medications. Share your medication beliefs and concerns with your health care team Taking medication for diabetes can help keep you and your heart, eyes and kidneys healthy. Your doctor chooses the right medication, but you play the most important role in taking your medication in the right way. If you have diabetes, it can also help keep your blood glucose closer to ideal target levels and reduce or prevent health issues now and in the future. Link: https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors/aade7-self-care-behaviors-monitoring
Problem Solving	*Example Messages* Going on vacation, getting sick, eating out or playing a sport are some common scenarios where you need to problem solve around your food, activity, monitoring and medications. Are you worried about your diabetes? Discuss with your healthcare team any concern about your diabetes knowledge or skills. Link:https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors/problem-solving
Reducing Risks	*Example Messages* Type 2 diabetes mellitus increased your risk for developing other health problems Talk with your provider to your risks. Learning about your health risks can help prevent complications. Following your treatment plan and recommended health checkups are great ways to reduce your risk of complications Link: https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors/reducing-risks

Appendix G

Quality Improvement Financial Cost

Item	**Cost**
Printing Consent Forms	$0.00
Permission to use SDSCA	$25.00
Printing SDSCA questionnaires	$0.00
Total Costs	**$25.00**

Appendix H

	A	B	C	D	E	F	G	H	I	J	K
1	Participant ID number	Age	Gender	evel of Educatior	Socioeconomic Status	ngth of Diagnosis (Type 2 Diabete	Comorbities	Baseline Hemoglobin (Pre-Intervention)	Hemoglobin (Post-Intervention)	SDSCA (Pre-Interventino)	SDSCA (Post-Intervention)
2	*N=Total No. of Participants*										
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											

Appendix I

Recruitment Script/Flyer

Participants Needed for a Quality Improvement Project

Quality Improvement: Improving Type 2 Diabetes Self-Management and A1C Levels in Older Adult Veterans Using an Automated Message System

The purpose of this evidenced-based Diabetes Education Program to improve your self-management of Type 2 Diabetes Mellitus. Improved self-management will be achieved by sending you educational/motivational text messages for 12 weeks. Glycemic control, as seen by a decrease in hemoglobin A1C, and improved self-report of diabetes self-care activities will reflect the usefulness of the text messages on diabetes self-management. This diabetes education may help you increase your activity level, eat healthier, monitor your blood sugar levels better and be aware of reducing risks. Complying with these activities can help you better manage your Type 2 diabetes and help you experience less complications.

To participate in this project:

- Participants must be at least 65 years and older with Type 2 DM
- Participants must speak English and read English
- Participants must own a cellphone that can receive and send text messages
- Participants must have had their last documented hemoglobin A1C level greater than 8%
- Participants must pose the ability to perform diabetes self-management activities (physical activity, blood sugar testing, etc.)
- Participants cannot have type 1 diabetes
- Participants cannot have newly diagnosed diabetes (less three months)
- Participants cannot be physiologically unstable, as evidenced by recent hospitalization within the last three months
- Participants cannot have psychosis or any psychiatric condition which interfere with the ability to perform diabetes self-management activates
- Participants cannot have a past medical history of a cognitive deficit
- Participants must be able to complete informed consent for the QI project
-

Time commitment and Study location: You will be asked to receive regular diabetes management according to your chronic care regimen outlined by the NF/SG VHS outpatient clinic. Participants will additionally be receiving automated text messages from Annie three times each week during the hours of a typical workday for three months. Participants will be asked to complete a consent and questionnaire at their chronic care regimen appointment in the outpatient clinic, and a second questionnaire at their follow up visit three months later.

Benefits of participation: You may benefit from being in this diabetes educational project because you will receive free diabetes self-management education. This diabetes education may help you increase your activity level, eat healthier, monitor your blood sugar levels better and be aware of reducing risks. Through these activities you can gain better control of your diabetes. Through the education, you may improve your diabetes self-management skills and behaviors. Other benefits include the knowledge learned from the project, and reduced hemoglobin A1c levels.

Compensation: You will not have to pay. You will not be paid to take part in this project. Your insurance will not be billed for the diabetes education provided. This project is paid for by the Project Student Lead. The diabetes education received will not replace what the local organization routinely provides. Annie is a service free to all veterans, but plan charges may occur for messages received based on your cellphone carrier.

Contact Information: If you are interested in participating, or would like more information, please contact Danielle Brunson, at Redacted for Privacy During the project you will not be required to contact the project lead

This quality improvement project is being conducted under the direction of Danielle Brunson, BSN, Doctoral Candidate of Jacksonville University, and has been reviewed and approved by the Jacksonville University Institutional Review Board (JU IRB #2021-090).