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Reducing Risk Factors of Diabetes Mellitus Type II Development in Veterans Post Military Discharge Through the Patient Aligned Care Team Model and the Utilization of Preventive Programs Involving Lifestyle Changes.

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Approved: December 14, 2022

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A handwritten signature in cursive script that reads "Mary C. Loughran".

Abstract

Diabetes Type II (T2DM) prevalence is rising in America, becoming a focus for disease prevention. The American Diabetes Association (ADA) has highlighted the need to tackle the increased T2DM precursor, prediabetes, which ultimately leads to T2DM if risk factors remain unaddressed. One group of the American population with a high rate of prediabetes is the 9/11 Veteran cohort. The Veterans Affairs (VA) system has numerous health promotion missions. This system has highlighted its initiatives to address the development of T2DM. Specific to the 9/11 group, their primary T2DM contributory risk factor is obesity paired with the low utilization of already established evidence-based, comprehensive VA programs. Also, literature has shown that this group is limited in their knowledge of diabetes and prevention techniques. A quality improvement (QI) project was formulated to explore this clinical problem. Methods to address consisted of evidence-based literature findings and intervention of applications of proven programs paired with telehealth, care coordination, and a support person. Pre- and post-project implementation of risk factors of obesity, sedentary position, and lifestyle choices were evaluated through the application of resources. Results, findings, and interpretation suggest a definite decrease in the development of T2DM by decreasing T2DM risk factors based on laboratory findings, weight loss, and increasing physical activity.

Keywords: Veteran, pre-diabetes, prevention, 9/11 Veterans, telehealth, PACT, VA/VHA:nurse practitioner

Reducing Risk Factors of Diabetes Mellitus Type II: Development in Veterans Post Military Discharge Through Care Coordination and the Utilization of Preventive Programs Involving Lifestyle Changes.

The Veterans Health Administration (VHA) of the United States (US) Department of Veterans Affairs (VA) is the most extensive integrated healthcare system in the US, serving more than nine million Veterans (Ngo-Metzger et al., 2020). This system has numerous health promotion initiatives that are consistent across the VHA. Prevention of Diabetes Mellitus Type II (T2DM) is one of the core missions. According to the American Diabetes Association (ADA) (2020), 1.5 million Americans are diagnosed with diabetes every year. In 2022, The National Diabetes Statistics report estimated 37.3 million people with diabetes totaling 11.3% of the US population (Centers for Disease and Control [CDC], 2022). In 2019 there were 87, 647 death certificates denoting diabetes as the cause of death which makes diabetes the seventh leading cause of death in the US (ADA, 2020).

Diabetes is associated with numerous health conditions and subsequent complications. Some disease processes include vision impairment, renal disease, cardiovascular and cerebrovascular disorders, amputations, hospitalizations, and long-term care (ADA, 2020). In 2018, 17 million emergency department (ED) visits occurred with diabetes as the chief complaint, and 8.25 million hospitalizations listed diabetes as the patient diagnosis (CDC, 2021b). The overall healthcare cost for diabetes in 2017 was \$327 billion (ADA, 2022a). Direct medical costs are as follows: 30% related to hospital inpatient care, 30% in prescription medications to treat complications of diabetes, 15% in anti-diabetic agents, 15% in diabetes supplies, and 13% in physician office visits (ADA, 2022a). The average medical expenditure for people diagnosed with diabetes is \$16,752 annually (ADA, 2022c). Further analysis of

healthcare costs with adjustment for population age and sex differences showed that the average medical expenditures among people with diabetes are 2.3 times higher than those without diabetes (ADA, 2022).

Prediabetes is the first indication of developing T2DM. This precursor to T2DM is an elevated blood glucose outside the normal diagnostic of an hgbA1C < 5.7% but not greater than 6.4% as noted in Table 1 below (ADA, 2022d). An hgbA1C of 6.5% or higher indicates overt diabetes based on the ADA (ADA, 2022d). Tests are conducted in an outpatient clinic as a routine measurement of the hgbA1C. The hgbA1C measures average blood glucose for the past two to three months.

Table 1

ADA Diabetes Diagnostic Ranges

| Result | A1C |
|-------------|----------------|
| Normal | Less than 5.7% |
| Prediabetes | 5.7% to 6.4% |
| Diabetes | 6.5% or higher |

In 2019, 96 million Americans aged 18 and older had prediabetes (ADA, 2022b). More than 80% of those prediabetics are unaware (CDC, 2021a). The CDC (2017) indicated that prediabetes leads to T2DM within five years if risk factors are not addressed. Identifiable risks include obesity, sedentary lifestyles, and increased sugar consumption (CDC, 2021a).

According to the VHA Healthcare Utilization Report (2017), the fourth leading medical concern for enrolled post-9/11 Veterans is the development of diabetes (Wischnik, 2019).

Research has noted a drastic increase in T2DM in post-9/11 Veterans. Over 44% of post-9/11 Veterans are obese (BMI > 30 kg/m²), which exceeds the national obesity prevalence of 39% in people younger than 45 years of age (Wischik et al., 2019). The prevalence of T2DM is expected to rise as this young Veteran cohort ages (Wischik et al., 2019). According to Ngo-Metzger et al. (2020), prevention techniques are fundamental in the Veteran population due to the increased risk of environmental exposures in the military that contribute to poorer health outcomes. Additionally, higher rates of obesity are also related to a complex interaction of behavioral, social, and environmental factors (Wischik et al., 2019).

Based on clinical practice and previously stated evidence, the prevention of T2DM is an area where improvements can be made among post-9/11 Veterans. The VHA is equipped with programs to address the issue of prediabetes in post-9/11 Veterans. Specifically, the VA offers an evidence-based, comprehensive weight management program titled MOVE! The second program available to Veterans provides diabetes preventative education (VA- DPP). These interventions have proven successful. However, there is low utilization among post-9/11 Veterans (Wischik et al., 2019), with less than one-third enrolled in these programs. This Veteran cohort has unique challenges related to obesity and the development of T2DM, paired with statistically low utilization of available resources. Therefore, a quality improvement (QI) project involving a care coordination intervention was created to increase Veterans' virtual utilization of these two existing programs that could support a decrease in their risk factors for T2DM.

Literature Review

Literature was appraised using the Johns Hopkins Nursing Evidence-Based Practice Model (JHNEBP) (Dang et al., 2022). The search databases included PubMed and CINAHL using a combination of the following keywords: Veteran, diabetes, prediabetes, prevention,

telehealth, patient-aligned care team (PACT), Veterans Affairs (VA), Veterans health administration (VHA), nurse practitioner, and 9/11 Veterans. In this quality improvement (QI) project key words are defined as follows: (a) Veteran: a former member of the armed forces (Merriam, 2022a); (b) prediabetes: abnormal state that precedes the development of clinically evident diabetes (Merriam, 2022b); (c) 9/11 Veterans: Post- 9/11 Veterans include those who were military personnel during Operation Enduring Freedom (OEF); the US military's operation in Afghanistan between October 2001 and December 2014; Operation Iraqi Freedom (OIF), the conflict in Iraq between March 2003 and August 2010; Operation New Dawn (OND), the shift in US military engagement into an advisory and rebuilding, officially ending in December 2011; (d) telehealth: use of telecommunications which is Virtual Video Connect (VVC) used in the VA to provide access to health assessment, diagnosis, intervention, consultation, supervision, and information across distance (Mahtta, 2021); and (e) PACT, Patient Aligned Care Teams, based on the medical home model (Shekelle & Begashaw, 2021).

A total of 50 articles were reviewed, 26 in PubMed and 24 in CINHAL 24. The included studies ranged from the evidence levels of I, III, V, and VI, with high to good, A and B quality ratings. The studies included randomized control trials (RCTs), systematic reviews, and qualitative studies. The date ranges for the studies were between 2017 and 2022. Exclusion criteria were studies over five years, and the population was not post-9/11 Veterans.

The literature review identified five themes that contributed to obesity, leading to the development of T2DM. These themes were (a) distress and negative emotions, (b) social isolation, (c) perceived lack of control, (d) attitudes toward diabetes support, and (e) desire for information about stress, diabetes, health, and behavior (DiNardo et al., 2020). Wischik (2019) noted that high rates of overweight and obesity are seen in young Veterans, which increases their

risk for T2DM. Factors associated with obesity in OEF/OIF/OND Veterans are complex and interrelated and need to be applied when looking to address this issue. The factors included being overweight, sedentary lifestyle, lack of camaraderie in civilian life, transitioning from active duty to Veteran status, and behavioral health (Wischik et al., 2019).

According to Sampson et al. (2021), previous prevention techniques, such as verbal communication to change eating habits, are not up-to-date based on current diagnostic parameters, including annual hgbA1C assessments, follow-up on results, and referral to resources if needed. Therefore, these techniques are ineffective in preventing T2DM based on current guidelines (ADA, 2022b). Early identification of prediabetes is a focus for diabetes prevention (ADA, 2022b). Evidence has shown that with lifestyle modifications, prediabetes can be reversed or delayed (CDC, 2021a). Random control trials (RCTs) indicate prevention is achievable with intensive lifestyle interventions, including dietary change and physical activity (Moin et al., 2017). Per the ADA (2022) weight loss reduces T2DM development by 58% over three years.

One critical theme emphasized the behavioral aspect of diabetes management. Wischik et al. (2019) indicated that exercise-based programs and educational groups effectively address diabetes risk factors. Concerning Veterans and T2DM prevention, it was noted that the VA standardized MOVE! exercise program was enhanced by peer participation in a group setting (Moin et al., 2017). Veterans' engagement in presentation models increased when Veterans participated in behavioral groups rather than on their own (DiNardo et al., 2020). The MOVE! weight loss group program further enhanced engagement. Additionally, both an RCT trial (Sampson et al., 2021) and a qualitative study by DiNardo (2020) and Wischick (2019) emphasized that group settings and regular accountability reduce T2DM risks.

Care coordination is a primary care practice used to streamline the process for patients within a healthcare system. It organizes patient care activities while communicating patient information amongst those concerned with providing effective patient care (Agency for Health and Research Quality [AHRQ], 2022). Patients' needs and preferences are known and expressed to provide safe, appropriate, and effective care to the patient (AHRQ, 2022). The overarching goal is to deliver high-quality, high-value health care by using broad approaches to improve the health care delivery and coordination of activities (AHRQ, 2022). The VA's Patient Aligned Care Team (PACT) model achieves care coordination. This team-based model focuses on providing accessible, high-quality care and meeting the quadruple aims to improve patient experience population health, reduce cost and provide a positive work-life balance for the healthcare workforce (Shekelle & Begashaw, 2021). PACT has four team members that include the primary care provider (either a physician, physician's assistant, or a nurse practitioner), a registered nurse (RN), a licensed practical nurse (LPN), and lastly, the clerk or medical support assistant (Shekelle & Begashaw, 2021). Each team is expected to provide primary care for approximately 1200 Veterans (Shekelle & Begashaw, 2021).

Literature on the nurse practitioner (NP) role, per the American Association of Nurse Practitioners (AANP) (2022), demonstrates that NPs provide high-quality primary, acute, and specialty healthcare services. As clinicians, NPs support the fundamental aspect of chronic disease management as they blend clinical expertise in diagnosing and treating with an emphasis on disease prevention, health management, and patient education (AANP, 2022). Their comprehensive healthcare perspective supports chronic disease management as a fundamental partnership between healthcare providers and individuals, requiring goal setting, bilateral communication, and motivation (Young et al., 2020). NPs are trained to operate independently

and can implement the chronic care manager role. Robust evidence supports that adding a dedicated chronic care manager can improve some patient outcomes (Shekelle et al., 2021).

Veterans desire increased access to information, support, education, and follow-up (DiNardo et al., 2020). Telehealth services have been shown to bridge this gap in access to care (Mahtta et al., 2021). A systematic review showed that glycated hemoglobin levels (HgbA1C) were lower in the telehealth group than in standard, in-person, clinic-based care (DiNardo et al., 2020). An RCT trial by Sampson et al. (2021) concluded that regular telephone and video contact significantly reduced risk factors of T2D. The VA telehealth platform is titled Virtual Video Connect (VVC). Telehealth has been shown to improve outcomes while providing a cost-effective mode of healthcare delivery and improving access and timeliness of care (Mahtta et al., 2021). Sampson et al. (2020) found that regular telephone and telehealth contact with patients markedly reduced T2DM risk factors.

Theoretical Framework or Conceptual Framework

An applicable theory utilized in this QI project is Leininger's Culture of Care Theory. This framework provides culturally congruent care through specific acts that are tailored to an individual group's beliefs, values, and lifestyles (Nursing Theory, 2020). The military has a specific culture regarding physical, mental, emotional, and relational demands. The difficulty arises after separation from active duty and the structure of that lifestyle. Veterans have noted difficulty transitioning into the civilian sector because previous demands are nonexistent or vastly different. Care coordination and the use of a support person correlate with Leininger's theory and can assist in cultivating the nurse-patient relationship by collaborating to creatively design a lifestyle of health and well-being for the patient (Nursing Theory, 2020).

Additionally, the IOWA Model was selected as a framework to guide the QI project. This model empowers nurses and healthcare providers to translate research findings into clinical practice while improving patient outcomes. The first step in this framework is a clinical trigger. For this project, being a Veteran and nurse practitioner in primary care, patient clinical data showed increased A1C levels and weights in the post-9/11 Veteran population, putting them at an increased risk for prediabetes and eventually T2DM if their healthcare behaviors are not changed. Therefore, this project was created to determine whether increasing virtual utilization of the MOVE! and DPP Programs among post-9/11 Veterans supported by an NP care coordinator will decrease their T2DM risk factors.

The Plan-Do-Study-Act (PDSA) method was used in this QI project. The PDSA cycle provides a structured approach to problem-solving, improving a process, or leading a change initiative by going through the iterative phases of Plan Do, Study, and Act.

Description of Project

Purpose of the QI. Project and Clinical Question

This Veteran cohort has unique challenges related to obesity and the development of T2DM, paired with low-utilization VA programs. Due to these findings, the clinical question and PICO was crafted as follows:

In post-9/11 Veterans, does utilizing the preventive programs at the VA, Weight Management Program - MOVE! and Diabetes Prevention Program (DPP), decrease the risk factors of Type II Diabetes Mellitus (T2DM) and improve identified client outcomes?

- **P:** Post 9/11 Veterans, 21-45 years of age

- **I:** Implementing MOVE! and DPP programs, virtually, that follow the American Diabetes Association's (ADA's) standards of living guidelines, specific to education on preventive measures of diet, nutrition, weight loss, and exercise
- **C:** Comparing specific outcomes pre-and post-MOVE! and DPP courses;
Outcomes: exercise in minutes, hgbA1C, weight, and diabetes knowledge
- **O:** Improved measured outcomes: exercise in minutes, hgbA1C, weight, diabetes knowledge.

Aims and Objectives

The following aims and objectives were identified to support this QI project.

Aim 1:

Identify Post 9/11 Veterans to participate in MOVE! and DPP programs on lifestyle changes being treated at the VA (Plan) based on Patient Aligned Care Team "PACT" derived from the Patient-Care Medical Home Model (Rosland et al., 2013).

Objectives

1. Utilizing the Care Coordination Model, 10 Veterans will be engaged to participate in MOVE! and DPP Programs on lifestyle changes through a review of electronic health records at the VA. Participants must meet the ADA's; prediabetes criteria validated by NP coordinator and agree to participate in seven weekly courses.
2. Administer Pre-MOVE! and prediabetes surveys to participants.
3. Coordinate enrollment in the MOVE and DPP group sessions to support the comradery theme.
4. Obtain baseline measures prior to the start of the project from the Veteran participants on HgbA1C and weight and baseline minutes of aerobic activity.

Aim 2

Increase Veteran understanding of T2DM and the impact of preventive measures through the utilization of the MOVE! and DPP programs.

Objectives

1. Complete MOVE! Seven-weekly educational courses and ONCE virtual DPP Courses focus on established DPP topics and will be conducted via Video Connect (Tele-Health program).
2. Implement MOVE! Program to track exercise activity. Minutes of exercise per participant will be reviewed by the NP coordinator weekly via phone call with the Veteran.
3. Administer the VA standardized DPP survey at the completion of seven weekly courses on content reviewed.

Aim 3

Assessment of risk factors for T2DM after completion of DPP and MOVE! Seven weekly sessions.

Objectives

1. NP care Coordinator will obtain post-measures from the Veteran participants on HgbA1C - HgbA1C will decrease by one decimal over a seven-week time frame. Weight- weight in lbs measurements will show a 7% decrease from pre-program weight based on ADA guidelines.
2. Participants will demonstrate a 30% increase in aerobic activity (150 minutes per week based on ADA guidelines) through recording of daily and weekly aerobic activity time collected by NP coordinator via a weekly phone visit.

Overview of Methodology

Quality Improvement

The University institutional review board (IRB) approved this study as a QI project due to meeting the exempt status criteria. Additionally, the VA primary care leadership approved the

implementation of this project. Veterans voluntarily agreed to participate in this QI project and were informed that their participation was voluntary and that they could leave the project at any time. Completing the pre-survey, MOVE! Program orientation, and enrollment in the DPP course also constituted their consent to participate in this QI project.

Setting and Population

The setting for this project is within the VA primary care clinics located in Midwest America. This was the opportune clinical site for evaluating T2DM since the PCPs have the knowledge and skill to perform thorough T2DM risk assessments, evaluations and ordering diagnostic studies as preventive measures. Potential participants were identified from a PCP panel that housed the most post-9/11 Veterans. These post-9/11 Veterans were selected from Primary Care based on ADA's prediabetes guidelines of an hgbA1C between 5.7-6.4% and age 21-50 years. From here, a VA data analyst retrieved a patient list that met defined guidelines to identify participants. This list had 147 Veterans who met those criteria. From this list, each chart was reviewed by the project manager (PM), and Veterans were excluded who were prescribed diabetes medication, no longer prediabetic based on ADA guidelines, or were newly diagnosed as diabetics. Thirty-three Veterans remained from this list, the PM called each Veteran to review the project and identify participants. Fourteen Veterans voluntarily agreed to participate. There are 18,555 prediabetic patients within all the primary care clinics at the project site (L. Webb. personal communication, December 7, 2022). There are 15,082 diabetic patients, indicating that there are 3,473 more prediabetics than people with diabetes. For this project, the primary care panel had 380 prediabetic patients out of 1200 with 143 patients fitting the demographic criteria (L. Webb. personal communication, December 7, 2022).

Implementation

Before discussing details regarding the implementation phases, it is essential to describe the critical project interventions, including utilizing two VA programs, MOVE! and Diabetes Prevention Program (DPP). MOVE! is the VA's comprehensive weight management program. It is supported by the VA's National Center for Health Promotion and Disease Prevention (NCP). It is a 16-week weight management program focusing on one of 16 modules each week based on health promotion that encourages healthy eating behavior, promotes weight loss, and increased physical activity (US Department of Veterans Affairs, 2022). This course meets weekly for one hour in a group led by a registered dietician (RD). For this QI project, the program was conducted virtually. Due to the timeline of this project, Veteran participants were only followed for seven of the 16 weeks. The module topics for those seven weeks included the following:

1. Tracking What You Do: tracking food, activity, busting barriers, and rewarding success
2. Tip The Balance: calorie goal, eating few calories, burning more calories
3. Eat Wisely: healthy plate, food groups, the danger of liquid calories, portion size, building a healthy plate, and busting barriers
4. Get Fit for Life: types of physical activity, activity amounts, measures of intensity, preparing to get fit, busting barriers
5. Take Charge of Your Weight: raising awareness, conquering unhelpful thoughts and emotional triggers
6. Menu Planning: meal planning, smart shopping, food label reading, how to cook healthier foods, to cook safely, to bust barriers

7. Managing Weight Loss Challenges: common weight loss challenges, steps to problem-solving, practice problem-solving, weight plateaus, getting the scale moving again (MOVE! Weight Management Program for Veterans, n.d.)

The second VA program used was the DPP course. This is a nationally recognized, evidenced-based program to decrease diabetes development. One two-hour session via the VA telehealth platform, VVC was held. The course reviewed basic knowledge of diabetes physiology and management, short and long-term complications and their prevention, lifestyle management, nutrition knowledge of carbohydrates, calorie counting, reading a food label, and using the plate method for controlling food portions.

The PM role is defined in this project as the NP care coordinator. For the remainder of this document, the NP care coordinator will be used. The operational role consisted of virtually coordinating the MOVE! and DPP programs, discussing project aims and objectives between program supervisors, Veteran participation and program enrollment, and ongoing assessment of project engagement. This role was singlehandedly run and operated by one NP care coordinator managing and engaging participants.

Phases of Implementation



The PDSA cycle guided the intervention's four parts: plan, do, study, and act. The entire QI project was conducted between July 2022 and November 2022. There were three phases. The

first phase began in June 2022 and until August 2022. In this “Plan” phase, several care coordination activities took place. Veteran participants were identified as previously described. The nine Veterans that volunteered to participate were sent a project welcome email which included a full outline of the project activities and timeline and the date and times of the MOVE! and DPP program meetings. The NP care coordinator met with the MOVE! program director to review the project and the list of participants and to enroll participants in the program. Before starting the program, all participants completed a one-hour MOVE! Orientation held by the MOVE! program director. Veteran participants had a choice of three orientations to attend, all held virtually. MOVE! Orientation reviewed the purpose, plan, outline, course, timeline, and needed materials.-All nine participants received educational materials in the mail and the MOVE! Training module book with the corresponding diary.

The NP care coordinator followed the same steps in enrolling the participants in the DPP 2-hr virtual course. This was done by meeting with the DPP director with a project overview and providing the list of Veteran participants. The NP care coordinator placed a DPP consult based on VA's protocols within the electronic health record (EHR) and verified with the DPP scheduler that all participants were enrolled. The NP care coordinator called and verified with each participant that they received mailed documents and had a working home scale for weekly weights.

A MOVE! pre-survey and Preventive Medicine Reports (PMR) prediabetes survey was administered (Appendix A). This survey was sent individually via SurveyMonkey texted to each participant. A follow-up phone conversation was held with each participant to establish the weekly phone visit date and time with the NP care coordinator. Finally, all nine Veterans had baseline data collected, including weight in pounds (achieved by in-home scale measure),

hgbA1C (NP care coordinator retrieved from the VA's HER), and exercise in minutes subjectively collected from each participant and noted on an excel spreadsheet for monitoring.

Phase 2

This was the "Act" component of the PDSA cycle. The seven-weekly one-hour virtual MOVE! Sessions were held via the VVC platform on Thursday mornings, and sessions were at the same time each week. The NP care coordinator attended weekly MOVE! sessions and kept a record of the week-to-week participant attendance.

During this phase the participants attended the two-hour DPP telehealth virtual presentation on diabetes education conducted by the diabetes prevention department at the VA, by a registered nurse and registered Dietician. This course was held on week five of the seven weeks for two hours. Weekly follow-up phone calls with all nine participants were held Monday thru Friday, beginning at nine am to seven pm by the NP care coordinator based on their designated times. Discussion points included the following: weekly weights, minutes of aerobic activity, strengths and barriers to participation, encouragement with the program, emotional and mental support, active listening, and ongoing care coordination with Veterans. All data was collected and recorded on an excel spreadsheet.

Phase 3

The NP care coordinator supported the collection of the post-hgbA1C laboratory tests by emailing the participant's PCPs who needed hgbA1C orders and providing the participants with the hours of operation for the lab and walk-in availability. Once the orders and laboratory schedule were solidified, each Veteran was informed via a phone call.

A MOVE! post survey and post PMR prediabetes survey was administered. An addition of seven qualitative and quantitative questions to assess additional Veteran input on barriers,

strengths, project suggestions, usefulness of NP care coordinator and the group setting were also included. The Excel spreadsheet was updated with data on post-survey results, participants' hgbA1Cs, weights, minutes of exercise, and program participation.

Data Management Plan

The VHA is a complex national system with a detailed EHR titled Computerized Patient Record System (CPRS) that houses existing data that provides clinicians, managers, support staff, researchers, and others with an integrated view of the patient record system (Department of Veterans Affairs Health Data Systems, 2021). Another interface helpful to this project is VISTA software. This platform incorporates the following essential information for this project such as laboratory values (hgbA1C), consult placement (MOVE! and DPP), Dietetics (dietician notes), progress notes (primary care providers updates on obesity and laboratory results), patient health problem list (Veterans identified as prediabetic), and vital statistics (weight and BMI). These systems represent a clinical/operational data repository via an EHR which stores data that shifts, and changes given the nature of the patient (McBride & Tietze, 2019). Both systems provide the necessary clinical components to a single interface for providers (and NP care coordinator) to manage patient care and records (Department of Veterans Affairs Health Data Systems, 2021).

Data Collection

A mixed methods approach was used to collect data during this QI project. Quantitative data was obtained via the collection of participant metrics and survey tools comparing pre-and post-interventions of the MOVE! and DPP programs. Nominal data was collected such as numbers associated with weight (pounds), minutes of aerobic activity, and hgbA1C results. Interval data was also collected since the Veteran is classified as prediabetic or not based on

hgbA1C and overweight or not based on BMI. Open-ended questions provided qualitative data regarding the project.

Survey

A 16- item pre-and post-survey was created based on two-questionnaires, a validated MOVE tool, and the Preventive Medicine Report (PMR) tool that was amended with Hyder et al., (2021) approval. The surveys were conducted via survey monkey. The NP care coordinator combined the questions (seven from the MOVE! and nine from the PMR tool) into a survey that was texted to each participant via SurveyMonkey. Additionally, a total of seven open-ended questions and three yes or no questions were asked to obtain further information from the participants and was added to the post-survey. The participants completed the pre-survey in week one and the post-survey in week seven.

The hgbA1C results were validated through the laboratory and the standards that they must maintain for accurate laboratory testing and reporting of results. The NP care coordinator validated the weights by viewing them during the weekly phone calls, and the Veterans self-reported their minutes of exercise activity.

DNP Project Results and Findings

At the beginning of the project 14 Veterans were identified with six participants completing all aspects of the project. The six participants consisted of four males and two females: ages 28-49 years old. The male age range was 30-49 years of age and the age range for the females was 28-38 years old. All six participants completed the pre-and post-surveys via SurveyMonkey and weekly phone calls with the participants ranged from ten to 60 minutes.

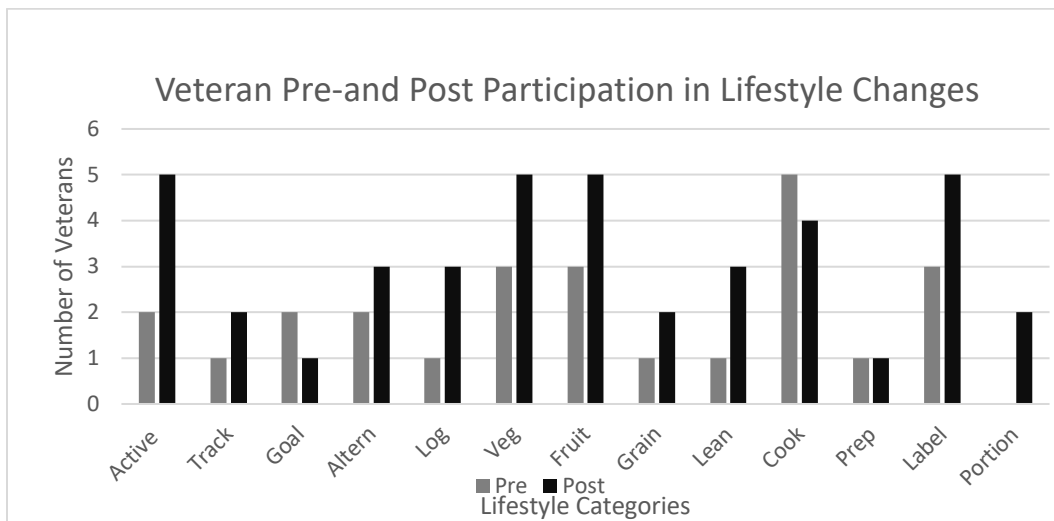
The NP care coordinator remained engaged with participants who could not complete the program due to employer conflicts, childcare needs, and timing of the classes. This allowed the

participants the opportunity to complete the programs according to their schedules that unfortunately, did not coincide with the project schedule of activities.

The participants completed seven virtual sessions of the weekly MOVE! program and attended the one virtual DPP course using VVC, the VA’s telehealth platform. The results of Question 7 on the Lifestyle Changes survey (Appendix A) before and after these interventions are noted below in Figure 1.

Figure 1

Question Seven Lifestyle Choices



Note: Pre-survey: gray bar; post-survey: black bar

Ten of the 13 categories exhibited an increase in the number of participants engaging in the healthy lifestyle changes pre-versus post-project. The categories are as follows: 150 minutes of aerobic activity per week, tracking activity in a log, alternating type of exercise, using a food/calorie log, consuming vegetables daily, consume fruits daily, consume whole grains, consume lean meats, cook at least one meal at home per week, reading food labels and measuring portion sizes. One category that did not change was meal prep. Two categories

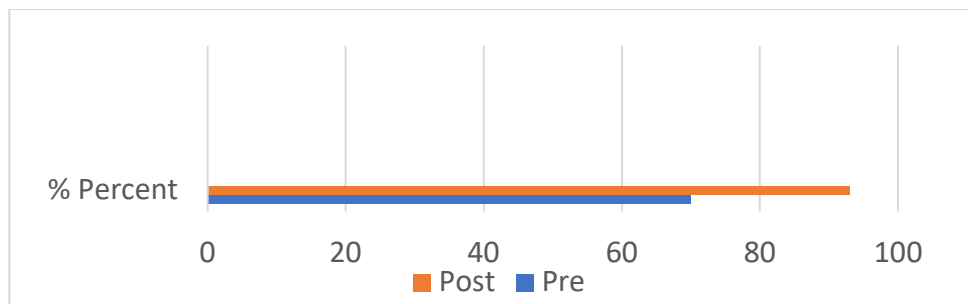
decreased, the number of participants engaging in setting weekly activity goals and cooking at least one meal at home.

Additionally, lifestyle survey showed the following results reflecting lifestyle changes: 72% increase in the amount of fruit consumption per day, 76% increase in the amount of vegetable consumption per day, 73% decrease in the amount of sweetened beverage intake per day, and 71% increase in the minutes of aerobic activity per week. There was a decrease in the number of days of physical activity per week, however, the minutes of physical activity increased by 71%.

The Lifestyle Changes survey was given before and after the DPP class on diabetes to assess participant knowledge on prediabetes. Those results are shown in Figure 2.

Figure 2

Percent Correct on Pre- and Post-Prediabetes Knowledge Survey



As noted in Figure 2 the average number correct on the pre-survey was 70% and the average correct on the post-survey was 93% indicating a 13% increase in prediabetes knowledge after the DPP course. Participants self-reported diabetes knowledge increased in their self-reported knowledge rating from “poor” to “good”

There were seven additional questions specific only to the post-survey resulting in open-ended and yes or no responses. Comments from the open-ended questions were:

1. What barriers did you encounter in the program? "During my work hours," "Scheduling at first but not many things after that," "Motivation to change," "Consistency due to injuries," and "Changing eating habits."

2. What was the most helpful aspect of the program? "Weekly meeting and checkups from (NP care coordinator)," "The group giving advice and the instructor explaining in detail what everything means and is." "Knowledge of prediabetics," "Learning what to do to help mitigate my blood glucose levels and try to keep healthy."

3. What was the least helpful aspect of the program? "More times for video sessions" "Having it during working hours," "Schedule of VVC appointments."

4. Do you have any suggestions on how to improve the program? "Consider taking inches loss into account for those of us who lift weights and the scale doesn't move as much," "Offer Saturday classes or 7 pm classes," "Make video appointments available outside of normal workday for participants who are employed."

The results from the participants on the three yes or no questions were:

1. Did the group format support your attendance and participation? 66% stated Yes
2. Did the weekly engagement with the NP care coordinator help? 100% stated Yes
3. Would you recommend this to other Veterans? 100% stated Yes.

The common themes identified from this data can be summarized as follows:

- a. Conflicting time of program offerings - program held during traditional working hours for some participants.
- b. Motivation to change
- c. Group comradery
- d. Desire for non-traditional program hours

- e. NP care coordinator support was helpful
- f. Reevaluation of weight loss metrics used

Some of these themes outlined coincide with the rationale as to why three participants were unable to complete the program; scheduled times of the MOVE! and DPP programs were during their scheduled work hours or childcare responsibilities.

The participants had their hgbA1C levels drawn prior to the start of the program and the range was 5.7%-6.2%. The post-hgbA1C range decreased to 5.5%-5.9%. On average, there was one decimal decrease in the participants' hgbA1Cs. The most significant participant change went from 6.2% to 5.8%. One Veteran successfully moved their hgbA1C from 5.7% to 5.5% which is normal, indicating that they are no longer prediabetic.

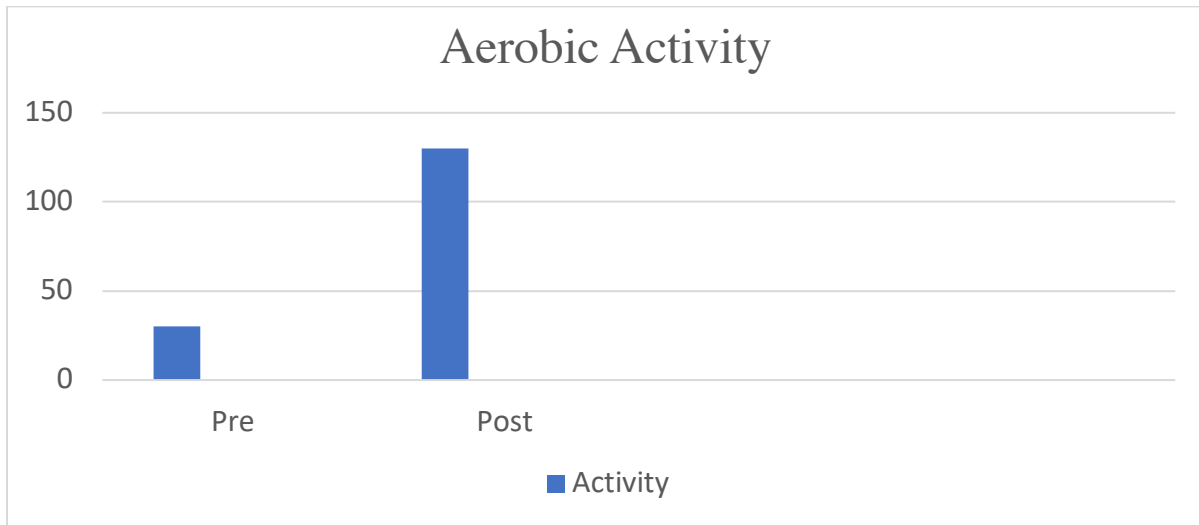
Weight loss and physical activity were also tracked in this QI project. There was an average of nine pounds lost amongst the six participants in seven weeks. The weight loss range was zero to 17 pounds. The average weight loss for the MOVE! Program is five to ten pounds over the 16-week program which indicates some participants surpassed or were on track to surpass the average program loss. The goal of a 7% weight loss per participant was not achieved, however, an average of 3.7% weight loss was seen, with the highest participant achieving a weight loss of 9%.

Aerobic activity which was defined as 150 minutes per week based on ADA guidelines was monitored during this project through recording of daily and weekly aerobic activity times collected by the NP care coordinator during the weekly phone visits. Baseline data concerning minutes of aerobic activity per week resulted in a median of 30 minutes per week among participants with the pre-project range from zero to 150 minutes per week. The post-project

median was 130 minutes with a range of zero to 240 minutes. This indicates a 333% increase in aerobic activity post-project implementation. The results are shown in Figure 3.

Figure 3

Minutes of Aerobic Activity Per Week



Note: Numerical content is in minutes.

Summary and Interpretation

Key Findings

Evidence in the literature coincides with the findings of this project of using weight reduction as a strategy to improve hgbA1C and reduce the risk of weight-related complications (Davies et al., 2022). Additionally, the DPP program increased knowledge of diabetes. The intervention of the MOVE! program supported the usefulness of exercise-based programs, and educational groups effectively addressing diabetes risk factors (Wischick et al., 2019). This intervention was associated with the outcomes of weight loss and increased aerobic activity outlined in the findings of the descriptive statistics. Specifically, these following outcomes:

- hgbA1C decreased by one decimal
- 3.9% median weight loss

- 333% increase in aerobic physical activity increase

Furthermore, 66% of participants agreed that the group setting improved adherence to the program (Moin et al., 2017). A theme in the group classes was that Veterans requested increased information and education on T2DM. Based on the DPP survey results participants post-prediabetes knowledge increased which stresses the importance of PCPs advocating the various VA programs designed to prevent T2DM especially in the post-9/11 Veterans.

This QI project was implemented in an entirely virtual mode of program delivery. The purpose of this intervention was to impact system utilization within the VA since telehealth services have been shown to bridge this gap in access to care (Mahetta et al., 2021). In general, these findings indicate that post-9/11 Veterans requested more time and coordination of telehealth programs to increase the program utilization. Also, participants requested additional telehealth time more consistent with their work schedule to increase utilization. Interestingly, 100% of participants remained engaged via weekly follow-ups with the NP care coordinator. Sampson et al. (2021) concluded that regular telephone contact significantly reduced risk factors of T2DM and this was exhibited in this QI project. Additionally, 100% of participants felt that the NP care coordinator increased adherence to the program, consistent with the literature that using a support person during lifestyle interventions improves patient outcomes (Sampson et al., 2021).

Unexpected benefits occurred during the weekly NP care coordinator phone visits. Many participants expressed emotional excitement about their progress and verbalized confidence in learning about diabetes. Also reflected in open-ended questions are “knowledge of prediabetics” and “learning what to do to help mitigate my blood glucose levels and try to keep healthy.”

Responses indicate a possible mental health boost and confidence in understanding and how to prevent T2DM.

During this project it was noted that the amount of time and diligence of the NP care coordinator to ensure that all participants were correctly enrolled in the programs was significant. Additionally, the NP care coordinator needed to be flexible in changing dates and times of weekly phone visits given the participants' daily schedules and juggling of personal life commitments.

No known ethical issues arose during this QI project. Potential barriers included participant's use of technology such as Wifi and audio and relying on it to function correctly. Also, the amount of weekly time needed from each participant could be a barrier to participation although this was not verbalized from these participants.

The impact on the VA system spans several disciplines. First, starting within PACT, is understanding the importance of an interdisciplinary approach to managing and preventing T2DM, with emphasis added for the primary care provider to encourage the patients to participate and consistently provide placement of consults to these programs. Currently, the MOVE! and DPP programs typically see fewer post-9/11 Veteran participants so there is opportunity to improve their participation in these already existing programs.

The cost-benefit of this project was completed. The average medical expenditure for a diabetic person is \$16,752 annually (ADA, 2022c). These six participants decreased their risk of developing T2DM equating to a \$100,512 per year health care savings. Looking at increasing participation in these programs with the VA prediabetic population would result in larger health care savings for the patient and the VA.

Limitations

This project is limited in its generalizability due to the small pilot study of six participants. The hgbA1C results were validated through the laboratory and the standards that they must maintain for accurate laboratory testing and reporting of results. Veterans self-reported their weight and minutes of aerobic activity, which has the potential for bias or imprecision in their methods. An effort was made to minimize these limitations with the regular, persistent engagement of the NP care coordinator with the participants and the departments. Also, the weekly collection of quantitative data (weight and minutes of aerobic activity) minimized the length of time that participants had to recall their data.

Conclusions and Recommendations

The final part of the PDSA cycle the Act phase. This QI project was shown to support increasing prediabetic knowledge and physical activity resulting in weight loss and decreased hgbA1Cs in the post-9/11 VA participants. Additionally, a health promotion concept would be applicable, empowering people to control the trajectory of their health with the hopes of improvement (Phillips, 2019). Long-term sustainability will involve the onboarding and support of all departments, which would be leveraged after a presentation by the NP care coordinator to PACT team providers to advocate for Veteran participation while also providing constructive feedback to the MOVE! and DPP programs on flexible virtual times for classes and ease of coordination.

Operating in the NP care coordinator role as an advanced practice nurse equipped the PM with the ability to empower and encourage participation and act an external force that advocated for patient adherence to the program. Thus, creating a neutral patient relationship to supplement the program. Due to this, the recommendation is to review adding other advanced practice nurses

as PACT care coordinators. At this time, at the VA used for this QI project, this role does not exist. Implementing an APRN as a care coordinator supports the AANP (2022) statement that APRNs are proven providers with the ability to respond to the pressing need for primary health care in our country.

Implications for further study

The next steps are to do this QI project with a larger post-9/11 Veteran population, given the limiting nature of a small pilot study. Assessing the adherence to MOVE! and DPP programs for the full 16-weeks when flexible course offerings are conducive to Veterans' work and childcare schedules and are supported by a care coordinator would provide a larger data set that could be analyzed.

Given the above findings, the implications of practice are vast. Overall, the evidence indicates that prediabetes has a higher incidence in post-9/11 Veterans (Wischik, et al., 2019). Thus providing a potential area to improve patient outcomes while altering the approach to T2DM prevention. The above results, interpretation, and evidence-based literature recommendations paired with this project's purpose ultimately led to using care coordination to increase Veterans' virtual utilization of the MOVE! and DPP programs that supported a decrease in some of the risk factors of T2DM of these post-9/11 Veteran participants.

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Appendix A

Pre and Post Survey Lifestyle Changes

1. In a typical day, how many cups of fruit do you consume? (Circle one)
(A cup of fruit is about the size of baseball or tennis ball)
 - a. None
 - b. Some, but less than 1 cup
 - c. 1 to less than 1.5 cups
 - d. 1 ½ - 2 cups
 - e. 2 cups or more

2. In a typical day, how many cups of vegetables do you consume? (Circle one)
(A cup of vegetables is about the size of a baseball or tennis ball)
 - a. None
 - b. Some, but less than 1 cup
 - c. 1 to less than 1.5 cups
 - d. 1 ½ - 2 cups
 - e. 2 cups or more

3. How many sweetened beverages do you drink daily (Circle one)
(Pop, energy drinks, coffee with sugar, fruit drinks, tea with sugar, Sports Drinks)
 - a. 4 or more cups or cans
 - b. 3-4 cups or cans
 - c. 1-2 cups or can
 - d. I don't drink sugar sweetened beverages

4. In the past week, how many days have you participated in physical activity? (Circle one)
 - a. 5 or more days
 - b. 2-4 days
 - c. 1 day
 - d. I am not physically active

5. How many minutes of aerobic exercise do you complete per week?
 - a. None
 - b. 1- 30 minutes
 - c. 31-60minutes
 - d. 61-150 minutes

6. Which of the following lifestyle choices you make on weekly basis (select all that apply)?
 - Physical activity (150 minutes of aerobic activity) **Yes or No**
 - Track activity in a log ? **Yes or No**
 - Set weekly activity goal? **Yes or No**
 - Alternate type of exercise? **Yes or No**
 - Use a food/calorie log? **Yes or No**
 - Consume vegetables daily Yes or No
 - Consume fruits daily Yes or No
 - Consume whole grains Yes or No
 - Consume lean meats Yes or No

Appendix A (Continued)

Cook at least one meal at home per day Yes or No

Meal prep Yes or No

Read food labels Yes or No

Measure portion sizes Yes or No

7. How would you rate your knowledge about diabetes from 0-5?

0- No knowledge

1- Very Poor

2- Poor

3- Average

4- Good

5- Very good

Diabetes Knowledge

8. Prediabetes condition can lead to

A. **Type 2 diabetes mellitus***

B. Type 1 diabetes mellitus

C. Both

D. None

9. What is the chance of one getting prediabetes if both their parents have type 2 Diabetes? A.

25–40 Percentage

B. **More than 50 percentage**

C. 10–15 percentage

D. 0 percentage

10. Which is the best method for detecting prediabetes conditions?

A. **Blood testing**

B. Urine testing

C. Both

D. None of the above

11. What is the fasting blood glucose level (after an overnight fast of 10 h) in prediabetes?

A. 140–199 mg/dl

B. <100 mg/dl

C. **100–125 mg/dl**

D. <200 mg/dl

12. Average blood glucose for the past 3 months is given by the blood test

A. **HbA1c Test**

B. Fructosamine Test

C. Fasting Blood Glucose Test

D. Oral Glucose Tolerance Test

Appendix A (Continued)

13. What is the importance of testing insulin levels along with glucose levels in prediabetes? A.

To identify insulin tolerance

B. To identify insulin overdose

C. **To identify insulin resistance**

D. None of the above

14.. Preferred recommendation for prediabetes control?

A. **Diet control and exercise**

B. Insulin Injections

C. Dental check up

D. None of the above

15. How often a prediabetic should do exercise?

A. Once a week for at least 30 mins

B. **Most days of the week for at least 30 mins**

C. Once a month for at least one hour

D. None of the above

16. How far weight reduction help prediabetes condition in obese patient?

A. Will Not help

B. **Greatly help**

C. Slightly help

D. Unsure

Post Questions

1. What barriers did you encounter in the program?
2. What was the most helpful aspect of the program?
3. What was the least helpful aspect of the program?
4. Do you have any suggestion on how to improve the program?
5. Did the group format support your attendance and participation?
6. Did the weekly engagement with the project manager (Jeni NP) help?
7. Would you recommend this to other Veterans? Yes or No