REDUCING TYPE 2 DIABETES RISK USING CLINICAL HEALTH

COACHES TO ALIGN NUTRITION, EXERCISE AND WELLBEING IN

ADULTS WITH OR AT RISK FOR PREDIABETES (ANEW-AP)

by

Jessica Tansey

A project brief submitted to the Faculty of the University of Delaware in
partial fulfillment of the requirements for the degree of Doctor of Nursing Practice

Spring 2022

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ACKNOWLEDGMENTS

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ABSTRACT

Background. About 88 million American adults have prediabetes and 84% are
unaware of it (CDC, 2021). The overall lifetime risk of adults with prediabetes
developing Type 2 Diabetes Mellitus (T2DM) is as high as 70% (Moin et al., 2018)
and is strongly linked to excess body weight and lifestyle factors (Hays et al., 2016).
Many Diabetes Prevention Programs (DPPs) exist, however are often too costly, labor-
intensive, and lengthy with high attrition rates. Clinical health coaches (CHC)
transform traditional DPPs by integrating skills such as motivational interviewing,
appreciative inquiry, assessing readiness to change, goal setting, and empowering
people to become active participants in their health.

Purpose. The project purpose was to enroll participants at risk for prediabetes
in a virtual group CHC program of Aligning Nutrition, Exercise and Wellbeing
(ANEW-AP) over 12 weeks. The aims of this project were to reduce body weight by
3-5% from baseline and increase Patient Activation Measure (PAM) level.

Methods. Sessions were held virtually via Zoom for 30-45 minutes once per
week for 12 weeks. Sessions included educational information presented to
participants and breakout rooms with CHCs. Data collected via REDCap included pre-
and post-intervention PAM score and self-reported weekly weights.

Results. Of the 20 participants screened, 17 met inclusion criteria to enroll in
ANEW-AP. Of the 17 participants, 12 participants successfully completed the
program. Due to small sample size, nonparametric testing analyzed the difference
between pre- and post-weight using Wilcoxon signed rank test. There was a

statistically significant difference (p=.006) between the pre-weight (X= 173.5, SD= 36.15) and the post-weight (X= 170.2, SD= 35.98). There was not a statistically significant difference (p=.883) between the pre-PAM (X= 45.3, SD= 5.89) and the post-PAM (X= 45.1, SD= 5.08).

Conclusion and Implications. ANEW-AP is a short and cost-effective program that produced statistically significant results of weight change. While PAM scores were not statistically significant, participants voiced satisfaction and knowledge increase after completing ANEW-AP. ANEW-AP increases awareness of prediabetes and promotes early lifestyle interventions to decrease risk for progression to T2DM.

Keywords: prediabetes, type 2 diabetes mellitus, clinical health coaching, weight loss, patient activation measure

Chapter 1

INTRODUCTION

1.1   Problem Statement

About 88 million American adults, 34.5% of the population, have prediabetes
(Centers for Disease Control and Prevention [CDC], 2021). Among Americans with
prediabetes, 84% are unaware of having prediabetes (CDC, 2021). According to Moin
and colleagues (2018), 15-30% of adults with prediabetes will develop T2DM within 5
years, and the overall lifetime risk can be as high as 70%. The development from
prediabetes to type 2 diabetes (T2DM) is strongly linked to excess body weight and
lifestyle factors (Hays et al., 2016). In reviewing 20 years of trends, increases in the
prevalence of obesity are paralleled with an increase in T2DM (Dexter et al., 2019).
The number of adults with T2DM in 2000 was 12 million, steadily increasing each
year, with the most recent number being 34.2 million in 2020 (CDC, 2021). During
this same time frame, the U.S. obesity prevalence increased from 30.5% of the
population in 2000 to 42.4% in 2018 (CDC, 2021). Currently in the United States,
73.6% of the population are overweight and out of this overweight population, 42.5%
are considered obese (CDC, 2021). The most important and effective strategy for
preventing T2DM is engaging in healthy lifestyle behaviors, specifically healthy
nutrition and physical activity that promotes weight loss (Hansen et al., 2018). There
is strong and consistent evidence that obesity management can delay the progression
from prediabetes to T2DM (American Diabetes Association [ADA], 2021). Modest
and sustained weight loss has been shown to improve glycemic control and reduce the

need for hypoglycemic medications in those who have T2DM (ADA, 2021). Fortunately, a small percentage of weight loss will reduce the risk for prediabetes and/or to improve one's health. Losing just five percent of one's weight can make a significant difference in reducing the risk of T2DM (Obesity Action Coalition, 2020).

1.2   Background/Project Purpose

Healthy People 2030 provides guidelines and goals in order to promote best health outcomes and reduce the economic burden in healthcare (Office of Disease Prevention and Health Promotion [ODPHP], 2021). Healthy People 2030 has an overall goal to reduce the burden of T2DM and improve quality of life for all people who have or are at risk for T2DM (ODPHP, 2021). Two sub-objectives that fall particularly under T2DM and overweight/obesity are to reduce the proportion of adults who do not know they have prediabetes and to increase the proportion of eligible people completing CDC-recognized T2DM prevention programs (ODPHP, 2021). These objectives support the need for programs that target weight loss, nutrition and physical activity to reduce the risk of prediabetes and its associated complications of developing T2DM, heart disease, and stroke (ODPHP, 2021).

1.2.1   Prediabetes

Many people do not even know they have prediabetes, therefore are unaware of the health risks until irreversible micro and macrovascular changes that are impacting their health. Prediabetes is a condition where hemoglobin A1C (HbA1c) levels between 5.7%-6.4% and/or fasting blood glucose levels between 100-125 mg/dL, which are higher than normal (ADA, 2021). The diagnosis of prediabetes is crucial as it increases an individuals' risk of developing T2DM in their lifetime.

T2DM is a disease in which there is resistance to insulin, which causes blood glucose levels to elevate above normal (ADA, 2021). Untreated elevated blood glucose levels can lead to devastating micro and macrovascular complications including, myocardial infarction, cerebrovascular accident, diabetic ketoacidosis, nephropathy, retinopathy, peripheral neuropathy, dermatological infections and more (ADA, 2021). Diabetes is the 7th leading cause of death, and the risk of developing diabetes increases with age (CDC, 2018). Not only does T2DM pose detrimental health risks, but also creates a heavy financial burden for the patient/family and the healthcare system with a 26% increase in total costs from $245 billion in 2012 to $327 billion in 2017 (ADA, 2018). In the state of Delaware, the total direct costs of medical expenses for diabetes were $700 million in 2017, and an additional $280 million was spent in indirect costs (ADA, 2017).

1.2.2 National Diabetes Prevention Program

With lifestyle changes, the incidence of T2DM could be lowered by 58% (Moin et al., 2018). The strongest evidence for diabetes prevention in the United States is the National Diabetes Prevention Program (NDPP) trial, a major Randomized Control Trial (RCT) conducted from 1996 to 2001 (ADA, 2020). The NDPP focuses on promoting intensive lifestyle interventions, including exercise, healthy diet, and weight loss in order to prevent T2DM (Khan, Tsipas, & Wozniak, 2017). The NDPP is cost-effective and has improved overall quality of life and decreased healthcare spending (Grock et al., 2017). The efficiency of the NDPP was investigated and with a 15-year follow up it was found that T2DM incidence was decreased by 27% in the lifestyle group (Grock, Ku, Kim, & Moin, 2017). While this national trial has changed

the approach to T2DM prevention worldwide and existed for 20 years, obesity and T2DM incidence continue to rise.

1.2.3 PCP and The Lone Provider

There is an urgent need to shift from the lone primary care provider (PCP) to a team-based model. According to Saba and colleagues (2012), a PCP alone would spend an estimated 21.7 hours per day to provide all recommendations for acute, chronic, and preventative care for an average number of patients. Half of patients seeking primary care have at least one chronic condition, and of those many either do not use medications as prescribed or implement lifestyle recommendations (Gastala et al., 2018). In focusing on T2DM education provided during office visits, the effectiveness of diabetes education programs is well reported however physician referrals remain inadequate (Macy et al., 2014). Other barriers related to the lack of physician referrals include decreased awareness, unclear referral process, and poor communication or follow up between physician and diabetes educators (Macy et al., 2014). Macy and colleagues (2014) found that 76% of patients diagnosed with T2DM did not receive referrals to diabetes self-management education (DSME). There is a lack of PCP education related to DSME and T2DM prevention in primary care therefore often prompts referral to an outside resource (Siminerio et al., 2019).

According to Pirbaglou and colleagues (2018), traditional approaches for T2DM self-management puts emphasis on conveying knowledge and then evaluating compliance to prescribed treatment. However, these approaches are consistently ineffective and do not provide patients with self-management skills and the behavioral support that are required for disease management (Pirbaglou et al., 2018). An innovative approach needs to be executed that co-exists with primary care by having a

team of experienced healthcare professionals working collaboratively to improve patient outcomes.

1.2.4   Collaborative Team Approach

Exceptional health care is executed by a collaborative approach, utilizing a multifunctional team with many different professionals and their clients (Morley & Cashell, 2017). A collaborative team approach supports participant success by bringing together a range of expertise for in the moment care discussions as well as ongoing collaborative care focusing on long term participant centered health outcomes. (Morley & Cashell, 2017). The team members present different perspectives, knowledge, skills and training which all work towards achieving common goals (Morley & Cashell, 2017). Collaboration is an efficient, effective and dynamic way to offer healthcare services by exercising a transformative approach to achieve successful patient outcomes (Morley & Cashell, 2017). Collaboration between PCPs and certified health coaches requires coordination, cooperation, shared decision making, and partnership (Morley & Cashell, 2017). Benefits of collaborative teams include improved sharing of evidence-based practice between professions, enhanced decision making, additional innovation, reduced hospital length of stay, increased compliance with medications, and improved symptom/psychosocial management (Morley & Cashell, 2017). Collaborative approaches in patient-clinician interactions generate trust and strengthen the relationship, which leads to greater levels of honesty, negotiation, successful adherence to medical care strategies, and reduced anxiety (Morley & Cashell, 2017).

1.2.5   Clinical Health Coaching (CHC)

Clinical health coaching (CHC) focuses on collaborative goal-oriented relationships between health professionals and patients with the aim of implementing a healthy lifestyle and/or making behavior changes to manage a chronic disease (Pirbaglou et al., 2018). CHC is a population-based approach to encouraging health lifestyle behaviors (Xiao et al. 2013). CHC professionals assist clients with health change principles so that clients are better able to adhere to recommendations for personal health and wellness. CHC techniques enable efficient use of consultation time by focusing on what patients can actively do to improve their health, ultimately promoting patients' responsibility for their own health management. Clinical health coaches (CHCs) transform patient conversations from 'teaching and telling' to 'listening and engaging' (Appelgate et al., 2013). CHCs integrate skills such as motivational interviewing, reflective listening, readiness to change assessments, goal setting, and empowering patients to become active self-managers in their care.

There is a growing body of evidence that CHC as an adjunct to primary care improves health outcomes. Presently, CHC is being used to decrease CVD risk, as it is the leading cause of death and currently accounts for more than $500 billion in health care spending in the United States (Willard-Grace et al., 2015). In an intervention of CHC provided by medical assistants over 12 months, researchers found that twice the proportion of participants who received CHC were able to achieve the HbA1c goal of 8.0 or less, however there was no significant change in blood pressure (Willard-Grace et al., 2015). When using CHC as in intervention for healthcare employees diagnosed with obesity and/or other CVD risk factors, researchers found that those who received CHC tripled their exercise routine from 0.8 times per week to 2.3 times per week and weight loss was also significant with an average of 7.2 pounds over 12 weeks (Edman

et al., 2019). In an intervention of digital lifestyle coaching via phone/phone application to prevent T2DM, 92% of participants were satisfied with their lifestyle coach and 88% of participants identified that their lifestyle coach was critical to their success (Williams et al., 2019).

Additionally, CHC has great potential for decreasing healthcare costs and uncovering patients' lack of office visits for routine and preventive care. According to Lanese and colleagues (2011), CHCs in a primary care environment found that 45% of people with T2DM do not receive the level of care needed in the past year, with only 15% seen 3 or more times, 25% seen twice, and 46% seen once (Lanese et al., 2011). After initiating a CHC program, office visits dramatically increase as well as laboratory testing (HbA1c, lipid panel, and microalbumin levels) (Lanese et al., 2011). While this increased office visit complexity and lab testing, this increase in patient activity increased overall revenue. In one year of CHC, there was a net balance of negative $3,781, however in the second year there is a profit of $36,905 (Lanese et al., 2011). When healthcare organizations implement measures to prevent avoidable hospitalizations and show meaningful use of resources, health outcomes improve as well as monetary penalties decrease from Centers for Medicare and Medicaid Services (Lanese et al., 2011).

1.2.6   Patient Activation

Effective behavior management and psychological well-being are essential to achieving treatment goals for those with or at risk for T2DM (ADA, 2021). The aspects of achieving successful behavior management are diabetes self-management education and support (DSMES), nutrition education, routine physical activity, smoking cessation when indicated, and appropriate attention to psychosocial care

(ADA, 2021). DSMES services facilitate the knowledge and decision-making skills necessary for optimal control or prevention of T2DM (ADA, 2021). The overall goal of DSMES is to improve patient activation, which encompasses informed decision-making skills, self-care behaviors, problem-solving and active collaboration with the health care team (ADA, 2021).

      Individuals who are less active in their health have more limited self-management skills and are more likely to experience health decline (Sacks et al., 2017). A well-known tool for measuring how active a patient is in their self-management skills, which is essential with chronic conditions such as T2DM is the Patient Activation Measure (PAM). Patients who have lower activation levels, measured by the PAM, had 21-31% higher odds of developing a new chronic condition, including T2DM, in 1-3 years as compared to patients with higher activation levels (Sacks et al., 2017). In patients with prediabetes, a higher baseline activation level was associated with a greater likelihood of having blood pressure, high-density lipoprotein, low-density lipoprotein and triglycerides within acceptable clinical ranges three years later (Sacks et al., 2017). Those with the highest level of patient activation had a 52% less likely chance of hospitalization when compared to those with the lowest level of activation (PAM 1) (Sacks et al., 2017).

      For those without prediabetes, the relationship between PAM level and risk of developing either prediabetes or T2DM was analyzed. Those with a PAM level of 1 were nearly twice as likely to have developed T2DM as those with a PAM level of 4 (0.9% compared to 0.5%) and they were 1.5 times as likely to have developed prediabetes (3.6% compared to 2.4%) (Sacks et al., 2017). Even the slightest increase in patient activation can have a significant impact on health outcomes. Those with a

PAM level of 2 were 23% less likely to develop prediabetes compared to those with a PAM level of 1 (Sacks et al., 2017). These findings highlight the role of patient activation in improving health outcomes for patients with prediabetes and support the need to tailor lifestyle interventions based on the individual's baseline activation (Sacks et al., 2017). PCPs who engage in specific patient partnership strategies, including emphasizing patient-driven advocacy, can support their patients in behavior change and activation development (Sacks et al., 2017).

1.3   PICOTS Question

The PICOTS question format as described by Melnyk and Fineout-Overholt (2018) is a means for formulation of clinical questions that are both answerable, and researchable (PICOTS = Patient population; Intervention or area of interest; Comparison intervention or group; Outcome; Time, Setting). The PICOT for this clinical problem is: In adults aged 18 or older who are diagnosed with or at risk for Prediabetes (via Prediabetes Risk Test) (P) does implementing a virtual group clinical health coaching (CHC) program of Aligning Nutrition, Exercise and Wellbeing to reduce T2DM risk (ANEW-AP) (I) at a health coaching clinic (S) decrease weight loss by 3-5% (self-reported) and increase in ability to self-manage health (PAM) (O) compared to baseline (C) over a 3 month time period (T)?

1.4   Theoretical Framework: Self Determination Theory

Self-determination theory grew out of the work of psychologists Edward Deci and Richard Ryan, who first introduced their ideas in their 1985 book Self-Determination and Intrinsic Motivation in Human Behavior. Self-Determination Theory (SDT) represents a broad framework for the study of human motivation and

personality. SDT articulates a meta-theory for framing motivational studies, a formal theory that defines intrinsic and varied extrinsic sources of motivation, and a description of the respective roles of intrinsic and types of extrinsic motivation in cognitive and social development and in individual differences. Perhaps more importantly, SDT propositions also focus on how social and cultural factors facilitate or undermine people's sense of volition and initiative, in addition to their well-being and the quality of their performance. Conditions supporting the individual's experience of autonomy, competence, and relatedness are argued to foster the most volitional and high-quality forms of motivation and engagement for activities, including enhanced performance, persistence, and creativity. In addition, SDT proposes that the degree to which any of these three psychological needs is unsupported or thwarted within a social context will have a robust detrimental impact on wellness in that setting.

The self-determination theory is a theory of motivation and self-regulation, which proposes that personally relevant goals are more internally motivated by the individual and thus, more likely to be obtained than goals set due to external pressure (Denneson et al., 2020). Self-determination theory specifies basic psychological needs which provide a foundation for motivation and development, including autonomy, competence, relatedness, and self-integration (Denneson et al., 2020). These are conditions that facilitate internal motivation and support individuals to integrate healthy behavior changes into their everyday lives and their sense of self, which in turn improves their likelihood to succeed in the necessary self-management skills to prevent chronic disease.

Autonomy refers to the sense that one's actions are the result of their own desire, which helps the individual understand that they have control over what happens in their life, and they are not a victim to external factors (Denneson et al., 2020). Competence is the belief in one's ability to affect behavior change and achieve desired outcomes. This component arises from self-efficacy, or the individual's perceived capability to make necessary behavior changes (Denneson et al., 2020). Relatedness is the extent to which one feels a connection with others, which often displays as someone they value and trust, such as a peer, parent or mentor who genuinely cares about their wellbeing (Denneson et al., 2020). Self-integration occurs when externally motivated behaviors become integrated into one's sense of self, which requires self-awareness, knowledge of purpose in life, knowledge of values, and understanding that their behaviors have meaning and importance (Denneson et al., 2020).

1.4.1   Self Determination Theory in CHC

When applying the Self Determination Theory in CHC, participants described their experiences as consistent with the process of motivation and goal achievement proposed by the theory. Participants reported that CHC supported their sense of autonomy by enabling them to set goals that were important to them, creating personalized action plans, and recognizing that they had control over the outcome of their action plans (Denneson et al., 2020). CHC is a flexible and personalized approach to promoting a healthy lifestyle which empowers participants to understand that their goals in life are self-driven. Participants achieved competence by attaining the confidence to tackle any challenge, which was a direct outcome of positive feedback from CHCs that was non-judgmental in nature (Denneson et al., 2020). Participants also reported that relatedness from developing a strong rapport with the

CHC, who was viewed as someone who equally bought into their progress, partnered with them on common goals, and treated them with respect (Denneson et al., 2020).

A continuous theme found throughout CHC was that participants developed a stronger sense of self, meaning they could define what they value in their life and what matters most to them (Denneson et al., 2020). After CHC, participants had a better understanding of their purpose in life, which provided them with a form of external motivation that could continue beyond the program itself (Denneson et al., 2020). Participants reported forward thinking by taking the goal-setting and action-planning skills that they learned in the program and applying them into their everyday behaviors. CHC is a process which uses the self-determination theory as a framework to support the primary outcome of changing behaviors in a sustainable way with health-related changes being a beneficial secondary outcome (Denneson et al., 2020).

Chapter 2

REVIEW OF THE LITERATURE

2.1   Search

A comprehensive search of the literature was performed to discover journal articles between 2014 and 2021. This initial search was conducted in November of 2019. A second search was conducted in July of 2021 for ongoing literature review. Cumulative Index of Nursing and Allied Health Literature (CINAHL) and PubMed databases were used to conduct this review of the literature. Inclusion criteria included: prediabetes or pre-diabetes or precursor diabetes or prediabetic state or type two diabetes, providers of healthcare or physicians or advanced practice nurses, weight loss programs, diabetes prevention programs, lifestyle interventions, and adults. Exclusion criteria included: Diagnosis of type 1 diabetes, current diagnosis of gestational diabetes/pregnancy, weight loss through medication management, surgical weight loss, non-English, underdeveloped countries, youth/children, patient perspective or outcomes only, nurse perspective, people with conditions including traumatic brain injury and human immunodeficiency virus, and people with mental illness. Articles that were periodicals or dissertations were also excluded.

The following Boolean phrases to identify barriers to T2DM education were used: (providers of health care or physicians or advanced practice nurses) AND (barriers or obstacles or challenges or difficulties or issues or problems) AND diabetes education. This search initially yielded 223 articles, and when the filter of 2014-2019 was placed the final yield was 92 articles. After reviewing 92 titles/abstracts, 75

articles were discarded due to immediate identified exclusion criteria, which left 17 articles for review. Ten articles met inclusion criteria after a full in-depth review of each article was completed (See Figure 2.1). Once reviewed, results of the studies were carefully analyzed and placed in a Literature Review Evaluation Table (Appendix A) for synthesis including the important details of author/date, sample, study design, aim, findings, and implications for practice.

Additional search terms were used to expand the literature search and solidify the evidence for project implication. Search terms included "prediabetes" or "prediabetic state" or "early stage diabetes" or "borderline diabetes", "prevention" or "intervention" or "treatment" or "program", "barriers", "weight loss" or "weight reduction" or "lose weight", "lifestyle modification" or "lifestyle change" or "lifestyle intervention", "diabetes prevention program", "health coaching", and "12 weeks" or "3 months".

Figure 2.1 PRISMA Diagram of Articles Selected for Evidence Review
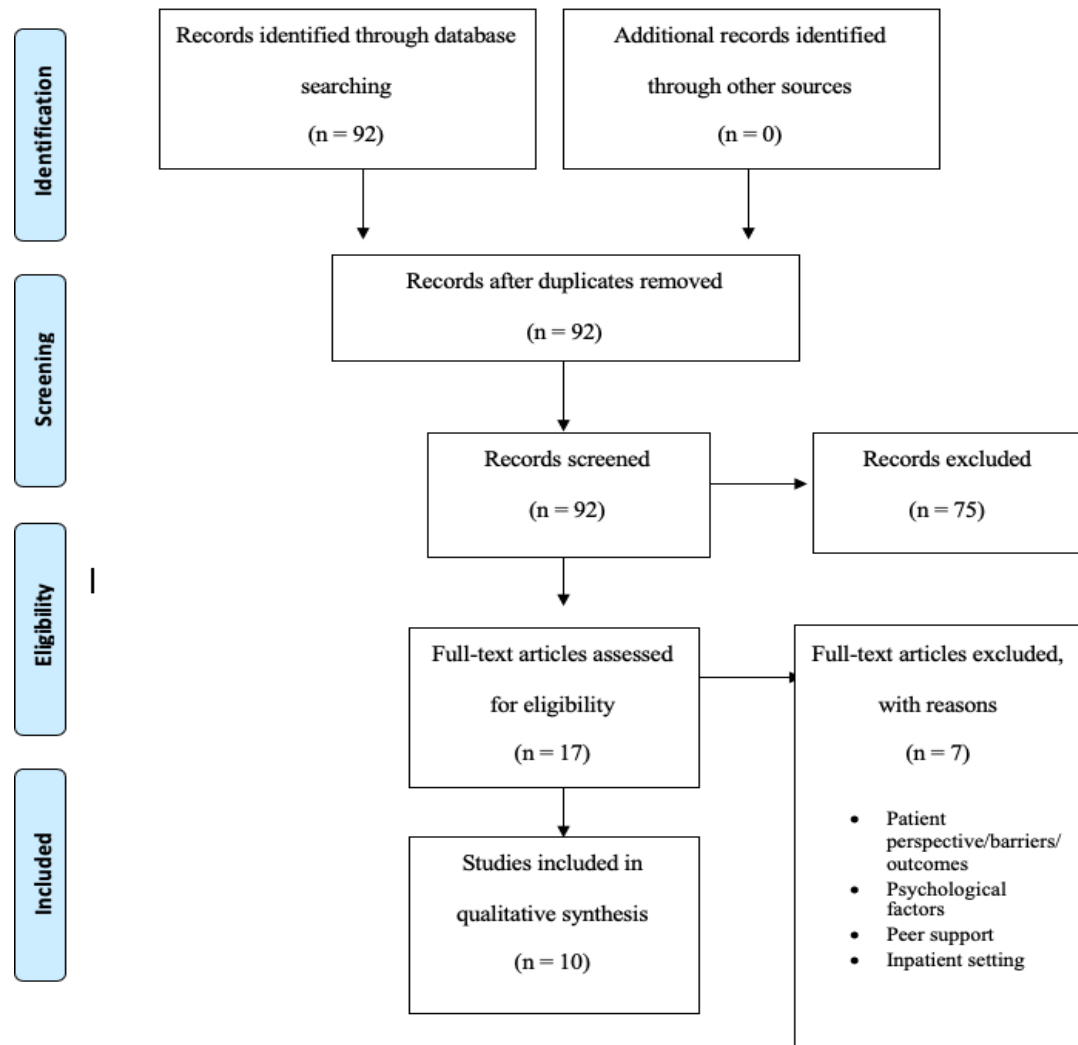
2.2 Review and Synthesis

Ongoing upward trends of obesity and T2DM diagnosis despite current prevention efforts is a growing concern and warrants a revised approach to prevention. The NDPP has been a guideline for T2DM prevention for 20 years yet obesity and T2DM incidences continue to rise. Risk factors for T2DM include but are not limited to overweight or obesity, sedentary lifestyle, unhealthy eating habits, genetic disposition, comorbidities including hypertension and hyperlipidemia, and diagnosis of prediabetes. People with prediabetes are 70% likely to develop T2DM in their lifetime and T2DM development is directly linked to excess body weight. In order to reduce T2DM risk in people with prediabetes, the current evidence in the literature suggests reviewing current practice of T2DM prevention measures, understanding associated barriers, and utilizing a multifaceted approach.

2.2.1 Obesity and T2DM

Overweight and obesity are very strongly correlated with T2DM and are the most important culprit of insulin resistance, which occurs early in the disease process of T2DM (Chobot et al., 2018). Compared to those with normal weight, obesity has a 7-fold higher risk for men and a 12-fold higher risk for women developing T2DM. If people with prediabetes are able to reduce their weight, they can impede T2DM development altogether (Chobot et al., 2018). Obesity not only puts one at risk for developing T2DM, but also increases one's risk for diabetes-related complications if T2DM develops (Chobot et al., 2018). Additionally, increased weight combined with T2DM increases one's risk of cardiometabolic complications, a known leading cause of morbidity (Chobot et al., 2018). Obesity remains as the major risk factor of developing T2DM and the most important goal of preventing the disease is

counteracting excessive weight gain (Chobot et al., 2018). Reducing obesity is crucial in decreasing morbidity, mortality, and costs of treatment in T2DM (Chobot et al., 2018).

2.2.2 Barriers within the Healthcare System

The United States Preventive Services Task Force recommends screening all adults for obesity; however, the U.S. healthcare system still faces challenges in this area (Pantalone et al., 2017). There is continued lack of recognition of obesity as a disease, thus, continuously underdiagnosed by clinicians leading to postponed treatment and increased the likelihood of complications (Pantalone et al., 2017). Researchers conducted a retrospective review of electronic health records at Cleveland Clinic and found that almost 80% of the established patients met the clinical criteria for a diagnosis of f overweight or obese, however only half were diagnosed as such with appropriate ICD-9 coding (Pantalone et al., 2017). Furthermore, among those with an obesity ICD-9 code, comorbidities including T2DM, hypertension, and/or hyperlipidemia were in the electronic health record more often than those without comorbidities (Pantalone et al., 2017). Body weight is a modifiable risk factor and therefore should be addressed at every office visit, regardless of whether other diagnoses exist, in order to improve health outcomes. Identifying obesity is the first step to optimal interdisciplinary intervention to target lifestyle modification and reduce cardiovascular complications, especially in relation to T2DM (Pantalone et al., 2017).

In focusing on providing T2DM education provided during PCP visits, the efficiency of DSME is well reported, however 76% of patients diagnosed with T2DM did not receive referrals for DSME (Macy et al., 2014). PCPs reported the following

barriers to providing prevention strategies in routine care: lack of time, culture of patient blame and care expectations, person-centered assessments, healthcare focus on productivity, and patients' social determinants of health (Joensen et al., 2018). Low referral rates to prevention or educational programs are supported by the fact that some physicians felt that they were competent in managing patients with diabetes and did not need to refer to outside resources (Fogelman et al., 2015). While there are healthcare system barriers, there are also PCP knowledge deficits that are a factor in providing prevention or self-management education. Among 362 PCPs, 97% did provide lifestyle intervention counseling however 60% reported inadequate knowledge in nutrition (Fogelman et al., 2015). PCPs were able to provide basic physical activity and caloric intake education, however often recommended a dietician for an effective and comprehensive weight loss plan (Fogelman et al., 2015). This supports that collaboration of different healthcare professional skill sets are necessary to fully educate and support patients in diabetes prevention or management.

An additional barrier to providing T2DM education within the healthcare system includes low health literacy. According to The U.S. Department of Health & Human Services (2019), 77 million adults have basic or below basic health literacy. T2DM is a disease that requires proficient self-management skills therefore it is crucial that health literacy is assessed and that interventions are tailored towards most of the population who are not proficient in health literacy. It is unrealistic that adequate and multidimensional T2DM education will be provided during an office visit, especially if the patient has very low health literacy. Education on T2DM prevention or management should be an ongoing combination of in-person interaction, written materials, spoken communication and demonstration to accommodate all

learning styles and literacy levels. Lastly, lack of psychosocial support was another barrier in providing patients with T2DM education. Many patients expressed psychosocial deficits in T2DM education and PCPs did agree with this, however they stated they did not feel competent or comfortable enough to provide the support that patients needed (Stoop et al., 2019). Patients felt as though they were being given unrealistic advice, unsupported by their PCPs, and were receiving contraindicating recommendations from providers (Stoop et al., 2019). Again, this evidence supports the need to steer away from the lone provider and utilize health care professionals with different skill sets, such as clinical health coaches (CHC), that are more trained in meeting psychosocial needs by utilizing their skills of motivational interviewing and appreciative inquiry.

2.2.3   Barriers to Lifestyle Interventions in Overweight or Obese Adults

Lifestyle interventions remain the gold standard for obesity management and prevention of chronic disease. Lifestyle intervention programs that contain a combination of diet, physical activity, and behavioral treatment strategies are widely offered within community, clinical or research settings, however, report subpar outcomes and reduced effectiveness due to poor attendance and adherence rates (Burgess & Pumpa, 2017). For lifestyle intervention programs to be successful it is imperative that participants adhere to the recommendations that are being provided (Burgess & Pumpa, 2017). Those who drop out of the program or disengage early on are more likely to have poorer health outcomes, which is why it is important to understand barriers to adherence and tailor interventions accordingly (Burgess & Pumpa, 2017).

Lack of motivation is an ongoing barrier to adherence. Motivation tends to be higher in the initial stages of an intervention program, which is why many people do not sustain long programs (Burgess & Pumpa, 2017). Motivation can be directly impacted by results or lack thereof, such as weight loss, and many people are misguided in thinking that substantial weight loss must be achieved to improve their health (Burgess & Pumpa, 2017). Participants must be encouraged from the very beginning that the main purpose of the lifestyle intervention is to give them the proper skills to achieve sustainable behavior change throughout their lifetime. Lack of time, health/physical limitations, environmental, societal and social pressures, and difficulty managing negative thoughts or moods are more examples of barriers to lifestyle intervention adherence (Burgess & Pumpa, 2017). Participants typically struggle with poor time management or organizational skills as well as many external pressures including work/family routines, long commutes, holidays, weather, stress, illness, influence of peers, and socioeconomic constraints (Burgess & Pumpa, 2017).

It is important that lifestyle intervention programs are attractive in the way they are structured, meaning they are not too demanding of one's time or labor intensive where participants may feel overwhelmed before they even begin. To promote adherence, lifestyle intervention programs must openly discuss behavior change barriers not only in the beginning assessment but routinely throughout the program as well (Burgess & Pumpa, 2017). Using behavioral treatment strategies to address and overcome reported barriers by participants facilitates long-term engagement and adherence for adults with obesity, regardless of how long the intervention program is itself (Burgess & Pumpa, 2017). Collaborating with an interdisciplinary team is the best way to integrate behavior treatment strategies into

any lifestyle intervention to address barriers to behavior change and improve adherence (Burgess & Pumpa, 2017).

2.3   Literature Gaps in Current Diabetes Prevention Programs

There is a gap in successfully implementing a diabetes prevention program. Lack of resources, knowledge, time, confusing referral process, and patient participation/perceptions are all identified barriers. T2DM is a condition that is dependent on the skill of self-management, whether it be prevention or management focused. While the current NDPP is a well-known and a successful intervention, the NDPP is not well executed and incidence in T2DM and obesity continue to rise over time. The NDPP was effective in supporting that lifestyle modifications can reduce T2DM incidence by up to 58% compared to basic life advice, however execution remains problematic in many aspects (Mudaliar et al., 2016). It was discovered that even though primary prevention of any chronic disease is cost-effective, the NDPP lifestyle intervention was quite costly (about $1,399 per participant) and considered resource-intensive (Mudaliar et al., 2016). In addition, lifestyle and cultural patterns differ significantly therefore interventions must be tailored in those aspects as well (Mudaliar et al., 2016). The NDPP provided a foundation for primary prevention of diabetes however has necessitated further implications for research to achieve effectiveness, acceptability and sustainability (Mudaliar et al., 2016). The NDPP provided pathways to implementing lower-cost alternatives that consider regional, ethnic and lifestyle differences while retaining the NDPP core principles of modest weight loss (5-7%) via 150 minutes of moderate-intensity exercise per week and reducing calorie intake.

Multiple intervention programs that implemented these alterations have been evaluated for effectiveness. Forty-four studies with 8,995 participants were evaluated in order to analyze outcomes of weight loss and cardiometabolic risk factor changes (Mudaliar et al., 2016). Studies were included based on the criteria of a diagnosis of prediabetes, presence of 2 risk factors for T2DM including BMI >25, previous history of gestational diabetes, family history of T2DM, Asian American, Hispanic or non-hispanic African American, and lastly a score of greater than 5 on the ADA Diabetes Risk Test (Mudaliar et al., 2016). Programs amended the NDPP by changing duration or number of core sessions offered, conducted group sessions instead of individual, modified the type of lifestyle coach, or changed the monthly maintenance component (Mudaliar et al., 2016). Out of 44 lifestyle intervention programs, the following findings were discovered: Mean number of core sessions were 12.6 with mean core sessions attended being 11 (Mudaliar et al., 2016). Majority of studies included scheduled maintenance components varying from emails to in-person group sessions and ranged from 3-8 months post core intervention (Mudaliar et al., 2016). Mean study duration was 9.3 months, ranging from 3-15 months of core intervention (Mudaliar et al., 2016).

2.3.1 Attrition Rates

Across all studies, overall attrition rate was 23.5%, ranging from 0%-43.2% (Mudaliar et al., 2016). Effective translation of a lifestyle intervention program is multifactorial and dependent on referral, uptake, engagement, completion and post-program sustainability of outcomes (Mudaliar et al., 2016). It was found that in all studies, a mean of 25.5% of eligible participants did not enroll in the intervention, and of those who enrolled there was an additional 23.5% attrition (Mudaliar et al., 2016).

Encouraging participants to remain enrolled and complete the program is an area of focus for future interventions. In an intervention of a web-based program that targeted weight loss and T2DM prevention via providing exercise plans, nutritional diet education and having participants track their progress, completion was still a difficult task (Alcantara-Aragon et al., 2018). In order to have a program that was accessible at home, limiting time and transport constraints, a telematic intervention was developed with goals of decreased attrition. However, it was found that the mean dropout rate was 11.5% at 3 months, which then increased to 26.8% at 6 months (Alcantara-Aragon et al., 2018). While sustainability is a main goal of health outcomes, it is critical that there is retention of participants during the intervention. Further implications may indicate a shorter duration of core intervention, i.e. 3 months instead of 6-12 months, with or without a maintenance component offered to sustain long-term positive behavior changes.

2.3.2 Weight Loss Results

The mean weight loss across 44 studies of DPP was about 8.2 pounds, or 4% of total body weight (Mudaliar et al., 2016). Participants who were enrolled in these interventions were found to have higher start weight than the NDPP, which correlates with the rise in obesity prevalence (Mudaliar et al., 2016). One of the NDPP aims was to achieve and maintain a 7% total body weight loss over the first six months, with a pace of losing 1-2lb/week, because 7% was feasible to achieve and maintain and likely to lessen the risk of developing diabetes (ADA, 2020). However, this intensity of a weight loss may contribute to high attrition. Additionally, in several studies, it is shown that the majority of weight loss occurs in the first 3 months with minimal weight loss or maintenance of weight in 6-12 months. According to Chesla and

colleagues (2016), in a DPP which was culturally tailored for Chinese Americans, participants lost an average of 5.4% of their body weight over 6 months, with primary weight loss being in the first 3 months (core intervention phase). In a peer-led, culturally tailored DPP for Hispanic women, participants lost an average of 4.1% weight in 3 months, which remained the same throughout months 3-6 (McCurley et al., 2017). In a group based DPP which utilized habit-forming action planning, it was found that participants achieved a weight reduction of 5.76% in the first 3 months and 9.98% at 12 months (Knaiper et al., 2018). Participants who completed an intervention of lifestyle coaching to prevent T2DM provided via phone/ phone application were found to have a weight loss of 5.5 pounds in the first 3 months, 7.26 pounds in 6 months, and 9.9 pounds in 12 months (Williams et al., 2019).

2.4   Project Implications/Rationale

In more recent years, CHC has shown promising results in the management of T2DM and other chronic illnesses (Pirbaglou et al., 2018). CHC works to assist people in meeting disease-specific goals, support their self-efficacy, and monitor adherence while also discussing any sources of nonadherence to self-management routines (Pirbaglou et al., 2018). In a systematic review with meta-analysis, 22 studies were reviewed for the effectiveness of CHC. It was found that hemoglobin A1c levels (HbA1c) were improved at multiple follow-up intervals after completing CHC, including <3 months (-0.32%), 4-6 months (-0.50%), 7-9 months (-0.66%), and 12-18 months (-0.24%) (Pirbaglou et al., 2018). Four studies included self-efficacy as a variable, however only one study reported statistically significant increase in self-efficacy during CHC (Pirbaglou et al., 2018). Thirteen studies included psychological

outcomes from CHC, however only three studies demonstrated statistically significant differences in psychological distress in favor of CHC (Pirbaglou et al., 2018).

The review of literature suggests that a revised approach is needed in diabetes prevention and that CHC is effective in improving health outcomes. Programs need to be tailored in order to prevent attrition and encourage safe and healthy weight loss. Too intense of weight loss as well as long programs of 6-12 months discourages participants from successfully completing the intervention, especially if time is a constraint, or if they are unable to meet the intended weight loss goal. Further research is clearly indicated, especially to assess the effectiveness of program-specific components, such as training, supervision, intensity/frequency of classes, cost-effectiveness, etc. The project purpose was to screen interested or referred participants for an existing diagnosis of prediabetes or increased risk for prediabetes (using Prediabetes Risk Test) to a virtual group CHC intervention of aligning nutrition, exercise and wellbeing to prevent T2DM (ANEW-AP) over the course of 12 weeks. The aims of this project were to reduce body weight by 3-5% from baseline and increase PAM level.

Chapter 3

METHODOLOGY

3.1   Setting

With a practice change agreement (Appendix B), the project was implemented at the University of Delaware (UD) Clinical Health Coaching Research and Training Center (CHCRTC) located in the Tower building, which is adjacent to the UD's College of Health Sciences' Science, Technology & Advanced Research (STAR) Campus. The Tower is a 10-story building with 120,000 square-foot that opened in Fall 2018. The Tower building provides additional space at UD to drive critical research, discovery and innovation in the region while also helping to educate the next generation of healthcare professionals. The Tower was added to the STAR campus to allow for an expansion of basic biomedical and focused research in the areas of diabetes management, sleep, stroke, autism, Parkinson's, cardiovascular disease, pain and more. The CHCRTC has 3 private consulting rooms on the second floor of the Tower and video conference capabilities when needed including phone, Zoom or Microsoft Teams.

3.2   Participants

The population focus for this project was adults aged 18 years and older. Inclusion criteria was as follows: (a) age $\geq$ 18 years, (b) score > 5 on the Prediabetes Risk Test (Appendix B) or body mass index (BMI) $\geq$ 25 kg/m², (c) available Internet access, (d) email or willing to create an email and (e) able to read and speak English.

The exclusion criteria were as follows: (a) under 17 years of age, (b) current diagnosis of diabetes (Type 1 diabetes, T2DM, or gestational), (c) pregnancy (self-reported), (d) no Internet access, and (e) unable to read and speak English. Participants were recruited via ANEW-AP Flyers (Appendix D) which were posted in UD clinics located at STAR campus (Nurse Managed Primary Care Center, Nutrition Clinic, Physical Therapy, and Exercise Counseling) currently established local community partners (Christiana Care Primary Care offices), and online including UD CHC website, Facebook and Nextdoor.

On average, the CHCRTC manages 30-40 clients per month, and facilitates about 75-100 sessions. Currently, the CHCRTC facilitates group coaching sessions focused on chronic condition prevention and/or healthy lifestyle programming. The CHCRTC accepts approximately 20 participants per group program with end retention of 15-18 participant completion. For this project, the aim was to enroll up to 40 total participants that would be split evenly into two groups and followed a similar structure to the NDPP program of preventing T2DM.

3.3   Implementation

Participants who were referred to the CHCRTC or expressed interest in participating in the project were contacted by the project lead via telephone. Over the phone, the project lead asked the participants' the Prediabetes Risk Test Survey (Appendix E) which includes age, gender, gestational diabetes history, first degree relative history of diabetes, diagnosis of hypertension, physical activity status, and BMI. Depending on how the participant answered each category, 0-3 points were scored per question. If the participant scored a total of 5 points or more, they were at risk for prediabetes and/or T2DM, which qualified them for the ANEW-AP program.

3.3.1　Session 0: Client Intake

Once deemed eligible to participate in the project, the project lead forwarded each participants' contact information to the clinical health coaches (CHCs) via Microsoft Teams. The CHCs contacted each participant to individually set up Session 0 (virtually), or initial client intake, which lasted about 60 minutes. During this session, the CHC worked with participants to review and discuss the Client Intake Form (Appendix F). The CHCs reviewed expectations of the program and provided goal setting with each participant. The CHCs answered all questions prior to Session 1.

3.3.1.1　Client Intake Form

Prior to Session 0, the participants completed an electronic Client Intake Form. This included demographic and contact information, identified the participant's lifestyle change priorities and level of importance, current health habits, level of social/emotional wellness, and readiness to change. There was also a free-text section where the participant could make the CHC aware of any other needs that were not listed.

3.3.1.2　History Taking/Medication Reconciliation

The CHC discussed each participant's basic medical, family and social history focusing on any specific symptoms they were currently experiencing. Additionally, the CHC completed a current medication reconciliation, focusing on adherence, side effects, and why the participant was prescribed the medication in his/her own words. CHCs are trained to assist medication adherence by using behavioral strategies. CHCs advised participants to reach out to the project lead or their prescribing physician regarding specific medication questions (i.e. indication, duration, side effects, etc.).

3.3.1.3 Patient Activation Measure Survey (PAM)

Participants completed a pre-intervention Patient Activation Measure (PAM) survey (Appendix G) to assess their current ability to self-manage their health. The PAM is a tool used to measure activation of patient to provider interaction to move an individual from a passive patient to an active partner in their health (Seegobin et al., 2019). This tool measures an individual's knowledge, willingness and confidence to manage their health and wellness. The PAM survey is a 13-item questionnaire that is scored via a Likert scale, with a maximum score of 52 (highest level of activation). The 4 levels of activation are segmented into: Disengaged and overwhelmed (Score 0-13, Level 1), becoming aware but still struggling (Score 14-26, Level 2), taking action (Score 27-39, Level 3), and maintaining behaviors and pushing further (Score 40-52, Level 4) (Seegobin et al., 2019). These levels offer insight into the individual's perspective and engagement with the healthcare system as a whole. In Level 1, individuals solely believe their doctor is in charge of their health. In Level 2, the individual believes they could be doing more, but have low confidence in doing so. In Level 3, the individual's perspective shifts to an understanding that they are a crucial component of their healthcare team. Lastly, in Level 4, the individual's perspective is at the highest level of activation meaning they understand they are their own advocate and can optimally self-manage their health (Seegobin et al., 2019). Participants submitted a baseline PAM survey, with the goal of an increase in score post-intervention.

3.3.2 Sessions 1-11: Virtual Group CHC Sessions

Participants were coached in a group by UD Trained CHCs (500 hours of training through the UD program including a supervised practicum) and graduate level

students. After Session 0 was completed with each participant (N=17), CHCs held weekly group sessions via Zoom. These sessions are 30 minutes in duration, with the first 10 minutes focusing on relevant education topics. Once education topics were reviewed and discussed, break-out rooms with the ratio of 1:2 (CHC to participants) occurred for the duration of the session to address any individual concerns or needs. This allowed for personalization of CHC within a larger group. Similar to the DPP, ANEW-AP included educational topics tailored towards healthy eating, increasing physical activity, tracking progress of diet and exercise, and healthy behavior changes.

3.3.3 Between Sessions

After each group session, the CHC sent a session recap to the participants via email. CHCs prioritized this time to summarize the discussion topics and lessons learned during the group session for those who needed reinforcement and desired written materials accessible at home. For example, after the group session that introduced utilizing the activity/diet tracker, each participant received an email which demonstrated how to use it properly.

3.4 Project Timeline

The project development began during Summer of 2019 with initial literature review, development of PICOTS question, and draft of planned project. Project development was affirmed in DNP Project I during Fall of 2019 and continued in DNP Project II during summer of 2021. The literature review was updated during this time to include most recent studies and an institutional review board (IRB) application was submitted. Once IRB approval was obtained (Appendix C), recruitment took place in August 2021 to mid- September 2021. Participants who met

the IRB approved inclusion criteria were split into two groups, Tuesdays at 12:00pm and Wednesdays at 6:30pm. The project implementation took place in Fall of 2021 during DNP Project III. The remainder of the 2021-2022 academic year included data evaluation and analysis.

3.5 Ethical Considerations

The project purpose was for participants to be screened for T2DM risk (using Prediabetes Risk Test) and if identified to be at risk, were enrolled in virtual group CHC which consisted of an exercise and a nutrition plan over the course of 12 weeks. Aims of this project are 3-5% of total body weight loss and an increase in PAM level. There were ethical considerations, such as benefits and risks for the participants and practice, autonomy of the participants, respect for individuals, informed consent if needed, and option to withdraw. IRB approval was needed in order to protect human subjects, which was obtained prior to implementation. The DNP student project lead completed the collaborative institutional training initiative (CITI) and received certification. The DNP student project lead had no conflicts of interest.

3.6 Data Collection

Electronic data was collected and kept in Research Electronic Data Capture (REDCap), which is a web-based application to capture data for clinical research. REDCap is Health Insurance Portability and Accountability (HIPAA) compliant, secure, and user-friendly. Weekly data review was completed by the DNP student project lead via REDCap on a weekly basis from pre-intervention (week 0) to post-intervention (week 12). Participants who met inclusion criteria were screened for T2DM risk via Prediabetes Risk Test survey and ability to self-manage one's health

was assessed via the PAM survey. All biometric data (including initial BMI and weekly self-reported weigh-ins) and surveys were administered and accessed through REDCap. On site, the CHC notes were stored in UD HIPAA compliant Microsoft Teams folders per individual CHC assigned to each participant. Only study personnel who were CITI and HIPAA trained had access to the REDCap database and Microsoft Teams folder with ANEW-AP participant information. Participants were assigned a unique identifier specific number (0-17) associated with their data.

3.6.1 Data Review

The DNP student project lead and faculty project mentor reviewed data collected pre- and post-intervention and compared results. Participants data did not include any identifying markers on the surveys such as name, date of birth, medical diagnoses, or personal address. The project lead reviewed each participants' weight and PAM level pre-intervention (week 0) and post-intervention (week 12) to evaluate outcomes. A weight loss of 3-5% over 12 weeks suggests success of the intervention from an objective standpoint, supporting the current literature that limiting excess body weight and improving lifestyle factors can reduce T2DM risk (Hays et al., 2016). Any increase in PAM level suggests success from a subjective standpoint, supporting the literature that reports observing an improvement in the PAM score would mean the patient is gaining a better understanding of their condition(s) and eventually improving at self-management (Seegobin et al., 2019).

3.6.2 Data Analysis

Statistics, trends, and percentages were reviewed and analyzed in order to determine if weight decreased and ability to self-manage one's health improved

utilizing pre-intervention data as a comparison. Data results were analyzed via IBM Statistical Package for the Social Sciences (SPSS) Version 28. Data analysis translated the significance of utilizing virtual group CHC over 12 weeks for those who are at risk for prediabetes or T2DM as an evidence-based practice guideline.

3.7 Project Evaluation

Recruitment and retention took place weekly, ensuring that proper project implementation is occurring. Pre-intervention data was evaluated within week 0 and throughout the implementation. Evaluating project outcomes weekly ensured that implementation was following protocol and participants were reporting positive results.

3.8 Project Budget

The project budget was $0.00. All surveys were provided to participants electronically via REDCap, including Adult Informed Consent, Client Intake Form, pre-intervention weight and PAM survey, weekly weights, post-intervention weight and PAM survey. However, estimated CHC costs could include a one-on-one CHC of $90-120/session, a CHC consulting fee of $150 per hour, and/or a training the trainer program of $500 per hour (preparation, creation and implementation).

3.9 Project Close Out

The project was completed during the 2021 Fall semester. This included project implementation, data collection, project evaluation, and feedback. Project close identified and reviewed strengths and limitations of the project. Project close out and plan for dissemination was discussed and prepared with the faculty project mentor, Jennifer Saylor, PhD, APRN, ACNS-BC.

3.10 Dissemination Plan

The DNP project will be translated and disseminated into clinical practice to improve health outcomes in those who are at risk for developing T2DM. During dissemination, the findings of the project are communicated and presented. Findings include strengths and limitations of utilizing the intervention of group CHC, ANEW-AP, to provide those at risk for T2DM with the skills to sustain positive behavior changes using increased physical activity and healthy eating. Expressing positive findings creates a pathway for quality improvement and impacts future practice guidelines that are suggested to delay progression of prediabetes to T2DM. The plan for dissemination includes a DNP project brief document submission as well as a project defense/presentation to the UD School of Nursing faculty. The final presentation will take place Spring of 2022. Dissemination will also be provided to the project site, submission for publication through peer-reviewed academic journals and conferences.

Chapter 4

RESULTS

Results of Aligning Nutrition, Exercise and Wellbeing for Adults At Risk for Prediabetes (ANEW-AP) virtual group health coaching program were collected over a twelve-week implementation period. This chapter presents the results of data collected from ANEW-AP. The review of literature supports the data that was collected.

4.1 Introduction

This Doctor of Nursing Practice (DNP) project had important findings for adults who are at risk for prediabetes in weight loss and ability to self-manage one's health. Each participant was screened for inclusion criteria based on Age >18 years, body mass index (BMI) >25 kg/m^2, and Prediabetes Risk Score of >5. Based on this criterion, 17 participants were eligible for the intervention. Participants filled out initial data surveys via Research Electronic Data Capture (REDCap), including demographics, client intake form, pre-intervention weight and pre-intervention patient activation measure survey (PAM). These results were completed in their entirety prior to starting ANEW-AP. Each participant completed Session 0, or client intake, which was a 1:1 session with a clinical health coach (CHC) to determine barriers, goals, and expectations of the program. Participants attended one 30-minute zoom session per week and logged their weight weekly via REDCap. Attendance of participants was documented for every zoom session. Final participants submitted their final post-intervention weight along with the post-intervention PAM survey via REDCap.

4.2 Data Collection and Participants

Participants expressed interest in participating in the virtual ANEW-AP program via recruitment efforts including flyers, social media posts, word of mouth, and outpatient office referrals. Screening and eligibility were completed individually by the project lead. During project recruitment, 20 adults were screened, and 17 (85%) met inclusion criteria to begin ANEW-AP. Data collected for this project included weight, PAM survey results, and attendance to determine anew rate of the program. Demographics including age, gender, and race were also collected. Two participants dropped out of the program entirely by the halfway mark (6-week check in) and three participants missed 4 or more sessions total which terminated them from this project and their data were not included in this project brief. The aims of this project were 3-5% weight loss from baseline and an increase in ability to self-manage one's health. Data were cleaned and analyzed via IBM Statistical Package for the Social Sciences (SPSS) Version 28.

4.3 Results

4.3.1 Participant Characteristics

Of these 12 participants who successfully completed the ANEW-AP, 83.3% self-identified as female with ages ranging from 50 to 82 years old (See Table 4.1). Majority of the participants self-reported their race as Caucasian (n=10, 83.3%). BMI of participants ranged from 23 to 41.5 kg/m^2, with 83.3% participants having BMI >25 kg/m^2 and median BMI being 29 kg/m^2.

Table 4.1. Self-reported Demographic Characteristics of Participants who completed
Aligning Nutrition, Exercise and Wellness for Adults at Risk for
Prediabetes (ANEW-AP) (n=12)

Variable	N(%)
Gender	
Male	2 (16.7)
Female	10 (83.3)
Race	
Black or African American	1 (8.3)
Caucasian	10 (83.3)
Unknown/Not Reported	1 (8.3)
Ethnicity	
Hispanic or Latino	1 (8.3)
Not Hispanic or Latino	11 (91.7)

Participants completed a "Client Intake Form" that included a pre-intervention
health risk assessment using a Likert-type Scale. Three important questions were as
follows: "I want to lower my health risks," "I want to make healthier food choices,"
and "I want to increase physical activity." Majority of participants (67-92%) chose
that they "Strongly Agreed" for each of these questions, indicating their goals and
expectations of the program (see Table 4.2).

Table 4.2. Participants (who completed ANEW-AP) Pre-intervention Health Risk Assessments[a] (from Client Intake Form) scored via Likert-type Scale (n=12)

	Neither Agree nor Disagree	Agree	Strongly Agree
	N(%)	N(%)	N(%)
I Want to Lower My Health Risks	0 (0)	1 (8.3)	11 (91.7)
I Want to Make Healthier Food Choices	0 (0)	3 (25)	9 (75)
I Want to Increase Physical Activity	2 (16.7)	2 (16.7)	8 (66.7)

Note. [a]Table begins at Likert-type scale answer 'Neither Agree nor Disagree' as no participants answered 'Disagree' or 'Strongly Disagree'

4.3.2 Aim One

The first aim of this project was that participants would have a 3-5% weight loss after the virtual ANEW-AP program compared to baseline. Participants' weights were self-reported weekly via REDCap that was programmed to email weekly weight links to each participant every 7 days for 12 weeks from when initial data surveys were completed. Participants post-weight in pounds averaged 170.18 (SD=35.98) and ranged from 137.5-270, compared to their pre-weight in pounds averaged 173.5 (SD=36.15) and ranged from 138-273. Among the 12 participants who completed ANEW-AP, 25% (n=3) of the participants met the weight loss goal of at least 3-5% of their initial body weight (See Figure 4.1). In addition, only 2 (16.7) participants did not lose any weight and no one gained any weight measured in pounds after completing the ANEW-AP program. Due to small sample size, nonparametric testing analyzed the difference between pre- and post-weight using Wilcoxon signed rank

test. There was a statistically significant difference (p=.006) between the pre-weight (X= 173.5, SD= 36.15) and the post-weight (X= 170.2, SD= 35.98).

Figure 4.1. Percent of weight loss from baseline in those who completed ANEW-AP (n=12)

Percent Weight Loss

■ 0-3% ■ 3-5% ■ >5%
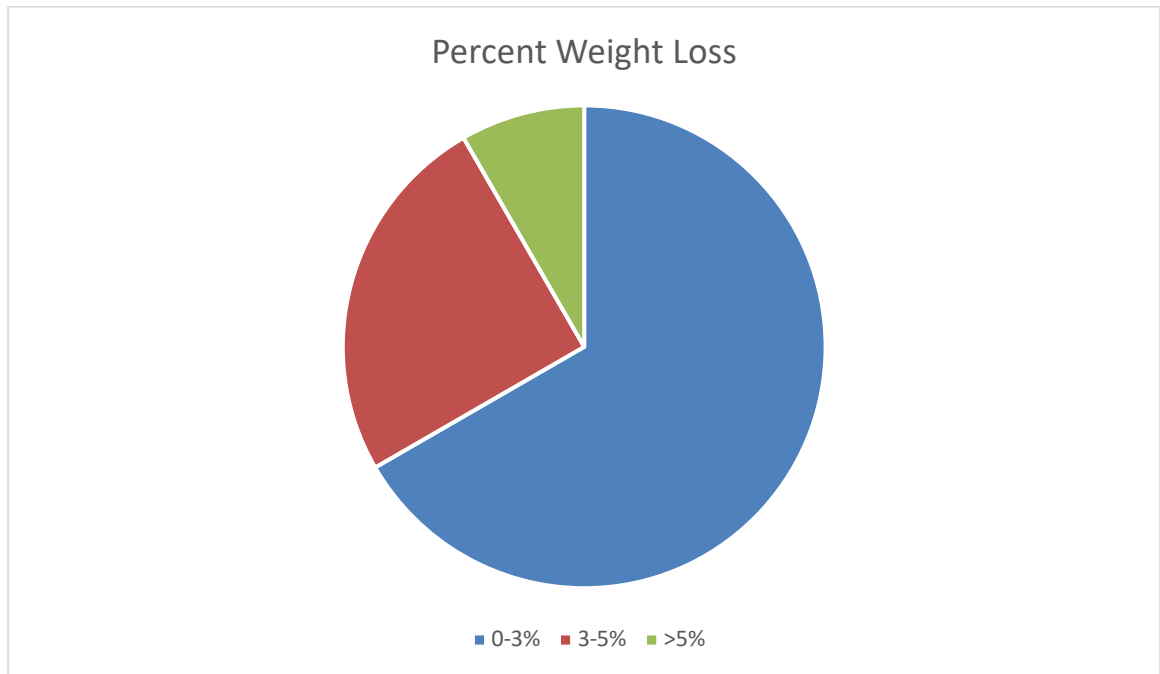
4.3.3 Aim Two

The second aim of the project was to measure the ability to self-manage one's health using the Patient Activation Measure (PAM). Pre-intervention PAM scores averaged 45.3 (SD = 5.89) and ranged from 35 to 52. Post-intervention PAM scores averaged 45.1 (SD= 5.08) and ranged from 39 to 52 (See Table 4.3). The post-intervention data yielded that only 7 participants completed the post-intervention PAM surveys even with daily email reminders via REDCap for 3 days total to promote completion. Due to small sample size, nonparametric testing analyzed the difference

between pre- and post-PAM scores using Wilcoxon signed rank test. There was not a statistically significant difference (p=.883) between the pre-PAM (X= 45.3, SD= 5.89) and the post-PAM (X= 45.1, SD= 5.08).

Table 4.3. Patient Activation Measure (PAM) Survey scores (Pre- and Post-Intervention) of those who completed ANEW-AP[a] (n=12)

Activation Level by Total PAM Score	Pre PAM	Post PAM
	N(%)	N(%)
Level 1 0-13	0 (0)	0 (0)
Level 2 14-26	0 (0)	0 (0)
Level 3 27-39	3 (25)	1 (8.3)
Level 4 40-52	9 (75)	6 (85.7)

Note. [a]Due to missing post-intervention data, not all statistics will equal 100%

With any longitudinal study, measuring attrition rate is important. The CHC documented weekly attendance and the project lead contacted each participant who missed a zoom session to address and overcome any barriers for participants' future attendance. In addition, participants who missed a session, were offered to join another class (Tuesday vs. Wednesday) and/or have a 1:1 session with a CHC to catch up on the educational materials presented. Twelve out of seventeen participants (71%) were retained throughout the program by completing 8 or more sessions. All participants were sent session recap emails after each session in order to have access to the information presented.

4.4 Limitations in Data Collection

There are a few limitations in data collection. The ANEW-AP program was provided to individuals virtually using zoom, thus self-reporting of participants' weekly weight may not be as accurate due to estimating their weight, use of different scales, and lack of scale calibration. While sample size was low, there was a statistically significant difference between pre and post weight. Participants who entered the ANEW-AP program had a higher-than-expected level of engagement and confidence in managing their personal health as measured by the PAM. Therefore, there was not a significant change in PAM scores from pre- to post-intervention.

Among the 12 participants who completed the ANEW-AP program, weekly attendance remained a limitation with 3 participants missing 3 sessions, 3 participants missing 2 sessions, 5 participants missing 1 session, and 1 participant missing 0 sessions. To mitigate this barrier, the project lead sent reminder emails 1 day prior to the Zoom sessions around week 6 of the intervention which had a positive impact on communication with the participants. Participants were more likely to report back to the team if they were unable to attend, which allowed the opportunity to offer attending a different class or scheduling a 1:1 meeting with a CHC so that they did not miss any information.

Chapter 5

INTERPRETATION OF THE DATA

5.1   Discussion

Aligning Nutrition, Exercise, and Wellbeing for Adults With or at Risk for Prediabetes (ANEW-AP) entailed a virtual group clinical health coaching (CHC) intervention that took place over 12 weeks to reduce risk for Type 2 Diabetes Mellitus (T2DM). The incidence of prediabetes is increasing, and the lifetime risk of developing T2DM in those who have prediabetes is 70%. Rise in T2DM is paralleled with obesity, therefore lifestyle interventions that target weight loss are found to be the most effective in reducing T2DM risk. The aims of this intervention were a 3-5% weight loss from baseline and increase in Patient Activation Measure Survey (PAM) score.

5.1.1   Weight Loss

The results in weight change pre-intervention to post-intervention were statistically significant. Eighty-three percent of participants lost weight during ANEW-AP, with 25% of participants losing the projected aim of 3-5% weight loss. No participants gained weight during the program, which is important considering the timing of implementation. Participants expressed in the Client Intake Form that they "strongly agreed" with wanting to make healthier food choices and increase physical activity prior to beginning this program. In participating or completing ANEW-AP, participants were provided the tools and knowledge to move towards achieving

sustainable weight loss over time. The clinical health coaches (CHCs) emphasized the harm of looking for 'quick fixes', for example, engaging in fad diets or other behaviors that would facilitate significant weight loss over a small period of time, which is why the aim of this program was 3-5% weight loss. Participants were provided with motivation to not only start, but also to continue this journey of making healthier food choices and increasing physical activity throughout their life span to overall reduce their risk for negative health outcomes.

5.1.2   PAM Survey Scores

Participants who enrolled in the ANEW-AP program scored higher than expected on the baseline PAM survey, which may have skewed the results. Although the increase in PAM scores was not statistically significant, there was a slight increase in mean scores. The project lead did not determine a set value of increase prior to implementation, therefore any increase in total scores was considered a positive impact. On the Client Intake Form, participants expressed that they strongly agreed they wanted to lower their health risks prior to ANEW-AP. The PAM survey scores the participant's knowledge and confidence in taking an active role in their health by engaging in lifestyle behaviors that will help prevent or minimize symptoms/complications associated with health conditions (actual vs. potential). Any increase in PAM score is significant in that participants are increasing their ability and confidence to self-manage their health, ultimately decreasing their overall risk for morbidity or mortality.

5.1.3 Participant Engagement/Retention

Retention of participants during this program was monitored and considered an indirect aim. Attendance was taken weekly and encouraged via email reminders along with offering 1:1 CHC sessions to those who missed any sessions. Fifteen out of seventeen participants were enrolled in the program from start to finish, however 3 of those participants missed a total of 4 or more sessions which terminated their data from analyses. Of the 17 participants originally enrolled in ANEW-AP, 12 participants successfully completed the program. Even though this program was considered group-style, there were many aspects of individualization that contributed to participant engagement/retention. Each participant worked directly with a CHC in Session 0 to discuss their individual goals and expectations. Participants voiced that this facilitated ease when the ANEW-AP started because the participants reported feeling like they knew the CHCs and recognized their faces. Additionally, after the education information was presented during the sessions, CHCs went into break out rooms which provided more opportunity for individualization of the program.

5.2 Project Limitations

Small sample size was a limitation of this project, however, was beneficial in that this provided opportunities for more one on one time with the participants. Another limitation could be the timing of implementation. Due to this program being held from October to December, which entails the holiday season, some participants voiced that attending the sessions every week along with tracking their diet was not a main priority at that time. Additionally, some participants expressed limited avenues to engage in physical activity due to the time change and cold weather.

5.3   Sustainability of Project

   The University of Delaware (UD) offers a graduate concentration/certification program to be trained as a CHC. Commonly, students with a health-related undergraduate degree will work towards this concentration while pursuing a master's or doctorate degree. The graduate students involved in ANEW-AP were completing their practicum hours for CHC certification. This certification allows one to stand alone as a CHC, participate in employee wellbeing programs within an organization or contracted CHC, and even collaborate with other health care professionals within a practice. ANEW-AP supports CHC in their role of collaborating with Advanced Practice Registered Nurses (APRNs) in facilitating positive behavior changes to promote wellness and reduce chronic disease risk.

   The UD Clinical Health Coaching Research and Training Center (CHCRTC) plans to continue ANEW-AP as well as expand this program to include other conditions including hypertension, cancer, chronic pain, etc. An ANEW-AP manual was created (located in Microsoft Teams) which includes all documents pertaining to this program so that it can be picked up easily and continued. This program is sustainable due to the positive benefits including low time commitment, an ideal setting, cost effectiveness, and tracking outcomes.

5.3.1   Low Time Commitment

   ANEW-AP is a program held over 12 weeks total, which is much shorter in duration than typical Diabetes Prevention Programs (DPPs) that occur on average for 16-24 weeks, or as long as 52 weeks. This is much less of a commitment for participants and other stakeholders and may spark increased interest and ability to commit to the program. The sessions themselves were also very short in duration.

ANEW-AP consisted of one 30–45-minute session per week, along with composing a wrap-up email that participants could read at their leisure. The short duration of each session allowed participants to attend these sessions during their lunch break.

5.3.2   Ideal Setting

The project team decided to implement ANEW-AP virtually due to the current COVID-19 pandemic. However, this aspect of the program greatly contributes to and supports sustainability. CHCs and participants do not need to be local to participate in this program. There was no travel required therefore no added time to the sessions/program. Internet access and a working email were required, but as long as those two are in place anyone can participate in ANEW-AP. The application used to facilitate ANEW-AP (Zoom) is very user-friendly and can be accessed via smartphone, tablet or computer. Cameras were not required.

5.3.3   Cost Effectiveness

ANEW-AP did not cost anything to the key stakeholders or participants. All surveys and forms were delivered electronically, therefore no costs were associated with printing papers. Zoom is free to use for participants and stakeholders. There were no costs associated with gas mileage or public transportation. Because this program was associated with a university, there was student involvement as a part of their practicum or clinical hours, which could decrease the costs towards hourly CHC rates. Currently, CHC is not able to be billed for insurance. However, the National Board for Health and Wellness Coaching (NBHWC) is gathering Current Procedural Terminology (CPT) III codes, which are introductory codes used to inform the American Medical Association of the wide use of CHC services. It is hopeful that by

2023, CHC will be supported by CPT I codes, which is billable by insurance. Sustaining ANEW-AP provides an opportunity to explore wellness programs that will be reimbursable in the future.

5.3.4 Outcome Tracking

This project measures and tracks participants' self-reported weight. Previously, the CHCs were encouraging participants to track their weights in the programs, however they were not collecting or trending these values. During Session 0 of ANEW-AP, participants viewed a weight loss chart with the CHC which showed them what a 3-5% weight loss looked like based on their current weight. This enabled participants to visualize and accept their goal. Then, by having participants submit their weights weekly via REDCap in ANEW-AP, accountability was increased between the participants and CHCs. Tracking outcomes also allows the CHCs and/or project team to evaluate their program in real time and analyze the results on a weekly basis to discuss progress with participants.

5.4 Significance of Change

ANEW-AP is greatly significant in emphasizing the importance of prevention and wellness. ANEW-AP increases awareness of prediabetes and promotes early lifestyle interventions to decrease risk for progression to T2DM. ANEW-AP provided DPP education topics approved by content experts (Registered Dietician and Exercise Physiologist). This program supports the Healthy People 2030 goal of increasing the proportion of people completing CDC-recognized Type 2 DPPs. The aims and findings of this program promotes small yet sustainable weight loss, which overall decreases T2DM risk. This program provided increased confidence in the ability to

self-manage one's health, promoting the participant to be an active manager in their life which is correlated with better health outcomes.

5.5   Implications for Advanced Practice

A larger sample size would be beneficial for future data analysis to provide more statistically significant results. An ideal sample size would be 40 or more participants total split evenly between groups, with no more than 20 participants per group in order to optimize sessions and time with the CHCs. As far as timing of implementation, it would be beneficial to conduct this program in the Spring, for example March to May, as participants may be more motivated to fully commit to the program. This program could be offered in various wellness centers, including the fitness centers such as the YMCA, employers such as employee-based wellness programs, contracted within private practices, and even promoted in school-based wellness centers, for students or parents. There is great potential for this program to facilitate even more positive health outcomes if offered in the right setting(s). This program could also be incentivized, especially for employees, in order to promote retention and engagement.

ANEW-AP provides early identification of risk for prediabetes or T2DM. The project lead utilized the Prediabetes Risk Test in order to screen participants for eligibility which also prompts discussion about each participant's individual risk factors for prediabetes or T2DM. Participants are able to identify their modifiable risk factors, including poor diet, lack of physical exercise, and/or excess weight, and create an action plan to reduce those risk factors. Over 12 weeks, ANEW-AP gives participants the knowledge, tools and motivation to put this action plan into place and sustain it over time to reduce their overall health risks.

5.6　Conclusion

ANEW-AP is a virtual group CHC program over 12 weeks that promotes weight loss and ability to self-manage one's health. Prediabetes and T2DM incidence continue to rise along with obesity, therefore engaging in healthy lifestyle behaviors is key. Preventing excess weight gain and being at a higher level of activation is related to better health outcomes. ANEW-AP is a short and cost-effective program that produced statistically significant results of weight change from pre-intervention to post-intervention. While PAM scores were not statistically significant, there was an increase in PAM scores from pre-intervention to post-intervention, and participants voiced satisfaction and knowledge increase after completing ANEW-AP. This program should be continued with a larger sample size and offered at a different time of the year to optimize results.

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Appendix A

LITERATURE REVIEW EVALUATION TABLE

Author and Date	Study Design	Sample	Aim	Findings	Implications for Practice
1. Joensen et al. (2018).	Qualitative	N=94	Identify challenges and solutions to integrating psychosocial support into routine diabetes care	Lack of time, skills and resources, culture of patient blame and care expectations, person-centered assessments, healthcare focus on productivity, Lack of including social determinants of health	More patient-provider dialogue, more training/better skills, system incentives for psychosocial outcomes, targeting social determinants of health and involving family/peers
2. Siminero et al. (2019)	Qualitative	N= Primary Care Providers (PCP) from 5 practices (total number unspecified)	Explore effectiveness of glucose to goal DSME and support model for PCP	Providers favored having a diabetes educator on staff to mitigate transport, scheduling, communication, help patients with nutrition needs	Diabetes educators should only give therapeutic advice only under physician supervision, diabetes educators would limit referral barriers
3. Winkley et al. (2018)	Qualitative with Semi Structured Interviews	N= 22 PCPs	Determine PCP views of group based education for DM2	21 favored this; 22 identified low attendance as a problem, patient barriers: access, difficulty communicating to certain populations	Suggestions for improvement: improve attendance by marketing, psychosocial support offered with it, follow-ups
4. Kim and Lee (2016)	Systematic Review with Meta-Analysis	N= 13 journal articles	Review health literacy sensitive diabetes management interventions for patients with low health literacy	Written communication, spoken, empowerment, and language/culture. Spoken leads to positive cognitive/psychological, self-care and health outcomes. These were effective in lowering hemoglobin A1c	PCP should integrate implementing low health literacy programs, routine use of spoken communication is best to achieve the best health outcomes in diabetes self-management education.

5. Stoop et al. (2019)	Qualitative	N= 20 people with diabetes; 18 PCPs	Examine psychosocial health care needs of people with diabetes from the perspectives of patients and providers and factors associated with positive attitude towards psychosocial health care	Patients expressed a need for psychosocial assessment from PCP; PCPs did not feel competent to do so. Patients feel not supported, unrealistic advice, contradiction from other PCPs, not receiving adequate care	Discussion tools and training should be provided to PCPs
6. Macy et al. (2014)	Qualitative	N= 10 PCPs	Assess barriers associated with PCP referrals to diabetes education program	Three barriers: lack of awareness, confusing referral process, and poor communication/ follow up between PCP and diabetes educator	Develop menu of services for diabetes education offerings explaining program; conduct lunch and learn with diabetes educator personnel; revise referral forms; ensure referrals are confirmed with PCP office and provide follow up with participation from patient
7. Liu et al. (2018)	Qualitative	N= 85 PCPs; 584 Patients	Investigate barriers to optimal diabetes control by looking at different perspectives of providers and patients	Physicians believed patients did not have sufficient understanding of harm and risk of DM-patients did not agree. Physicians identified insurance coverage as barrier and easy to use brochures/written education, patients' poor lifestyle choices were main barrier	Need for diabetes education and lifestyle intervention
8. Fogelman et al. (2015)	Qualitative	N= 362 Family PCPs	Examine sources of knowledge, attitudes and practices of PCPs regarding management of type two diabetes (T2DM)	PCPs do manage diabetes, recommendations included PA, decrease calorie intake, consult with dietician and weight loss counseling. 97% provided lifestyle intervention counseling; 60% reported lacking knowledge in nutrition; majority did not refer to diabetes specialists	Need strategies to enhance competencies of PCPs in diabetes management

60

9. Gucciardi et al. (2016)	Qualitative	N= 18 diabetes educators; 16 PCPs	Examine how health care professionals are introduced and transitioned into interprofessional work	Four themes in integrating interprofessional collaboration: negotiating space, place and role, fostering working relationships, performing collectively, enhancing knowledge exchange	These barriers must be overcome for successful interprofessional collaboration which is needed for patients
10. Gucciardi et al. (2015)	Qualitative	N=23 patients; 20 diabetes educators; 16 PCPs	Explore implementation process of integrating specialized diabetes teams into Primary Care	Themes: right place, time and services, creating partnerships, operational complexities and strategies	Pragmatic methods of implementing this model is required; Outlining roles and expectations of educators into PCPs team; clear communication for team collaboration

Appendix B

PRACTICE CHANGE AGREEMENT

Behavioral Health & Nutrition

Newark, DE 19716-3750
Phone: 302-831-2079
Fax: 302-831-4261

UNIVERSITY OF DELAWARE.

Date 7/14/2021

Dear School of Nursing Faculty,

This letter serves as a letter of agreement for this agency/organization (Clinical Health Coaching Research and Training Center, CHCRTC) to be a site for the project Reducing Type 2 Diabetes Risk using Clinical Health Coaches to Align Nutrition, Exercise and Wellbeing in Adults With or At Risk for Prediabetes (ANEW-AP) , conducted by Jessica Tansey and for the participation of the student's site mentor Tara Leonard during this project.
Sincerely,

Tara Leonard

Tara Leonard, MS, NBC-HWC
Clinical Instructor/Clinical Health Coach
Clinical Health Coaching Research and Training Center, Clinic Director
Department of Behavioral Health & Nutrition
College of Health Sciences, University of Delaware

The Tower at STAR
100 Discovery Boulevard, 2nd floor
Newark, DE 19713
302-831-3891, fax: 1 302 309 0113

Appendix C

IRB APPROVAL LETTER

Institutional Review Board
210H Hullihen Hall
Newark, DE 19716
Phone: 302-831-2137
Fax: 302-831-2828

UNIVERSITY OF DELAWARE.

DATE:	August 23, 2021
TO:	Jessica Tansey
FROM:	University of Delaware IRB
STUDY TITLE:	[1796265-1] Reducing Type 2 Diabetes using Clinical Health Coaches to Align Nutrition, Exercise and Wellbeing (ANEW-AP) in Adults at Risk for Prediabetes
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
EFFECTIVE DATE:	August 23, 2021
NEXT REPORT DUE:	August 22, 2022
REVIEW TYPE:	Expedited Review
REVIEW CATEGORY:	Expedited review category # *(7)*

Thank you for your New Project submission to the University of Delaware Institutional Review Board (UD IRB). The UD IRB has reviewed and APPROVED the proposed research and submitted documents via Expedited Review in compliance with the pertinent federal regulations.

As the Principal Investigator for this study, you are responsible for, and agree that:

- All research must be conducted in accordance with the protocol and all other study forms as approved in this submission. Any revisions to the approved study procedures or documents must be reviewed and approved by the IRB prior to their implementation. Please use the UD amendment form to request the review of any changes to approved study procedures or documents.

- Informed consent is a process that must allow prospective participants sufficient opportunity to discuss and consider whether to participate. IRB-approved and stamped consent documents must be used when enrolling participants and a written copy shall be given to the person signing the informed consent form.

- Unanticipated problems, serious adverse events involving risk to participants, and all non-compliance issues must be reported to this office in a timely fashion according with the UD requirements for reportable events. All sponsor reporting requirements must also be followed.

The UD IRB REQUIRES the submission of a PROGRESS REPORT DUE ON August 22, 2022. A continuing review/progress report form must be submitted to the UD IRB at least 45 days prior to the due date to allow for the review of that report.

If you have any questions, please contact the UD IRB Office at (302) 831-2137 or via email at hsrb-research@udel.edu. Please include the study title and reference number in all correspondence with this office.

Appendix D

ANEW-AP FLYER

Looking to create more healthy habits this Fall? Try ANEW-AP!

Aligning Nutrition Exercise & Wellbeing for Adults at Risk for Prediabetes

ABOUT THE PROGRAM: UD Clinical Health Coaching Research and Training Center and School of Nursing is offering a virtual group clinical health coaching program! Increase your awareness & understanding of nutrition, exercise and overall wellbeing! As long as you have Internet access, you can participate! Session Dates/Time: Only 30 minutes a week for 12 weeks with a health coach on Tuesdays & Wednesdays from September 28- December 14, 2021

Contact us today to find out more information! Email health-coaching@udel.edu or call 302-831-1839 with your name, phone number, email and preferred method of contact.

Appendix E

PREDIABETES RISK TEST SURVEY

Prediabetes Risk Test

1. How old are you?

Write your score in the boxes below

Younger than 40 years (0 points)
40–49 years (1 point)
50–59 years (2 points)
60 years or older (3 points)

2. Are you a man or a woman?

Man (1 point)   Woman (0 points)

3. If you are a woman, have you ever been diagnosed with gestational diabetes?

Yes (1 point)   No (0 points)

4. Do you have a mother, father, sister, or brother with diabetes?

Yes (1 point)   No (0 points)

5. Have you ever been diagnosed with high blood pressure?

Yes (1 point)   No (0 points)

6. Are you physically active?

Yes (0 points)   No (1 point)

7. What is your weight category?

(See chart at right)

Total score:

Height	Weight (lbs.)		
4'10"	119-142	143-190	191+
4'11"	124-147	148-197	198+
5'0"	128-152	153-203	204+
5'1"	132-157	158-210	211+
5'2"	136-163	164-217	218+
5'3"	141-168	169-224	225+
5'4"	145-173	174-231	232+
5'5"	150-179	180-239	240+
5'6"	155-185	186-246	247+
5'7"	159-190	191-254	255+
5'8"	164-196	197-261	262+
5'9"	169-202	203-269	270+
5'10"	174-208	209-277	278+
5'11"	179-214	215-285	286+
6'0"	184-220	221-293	294+
6'1"	189-226	227-301	302+
6'2"	194-232	233-310	311+
6'3"	200-239	240-318	319+
6'4"	205-245	246-327	328+
	1 Point	**2 Points**	**3 Points**

You weigh less than the 1 Point column (0 points)

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009. Original algorithm was validated without gestational diabetes as part of the model.

If you scored 5 or higher

You are at increased risk for having prediabetes and are at high risk for type 2 diabetes. However, only your doctor can tell for sure if you have type 2 diabetes or prediabetes, a condition in which blood sugar levels are higher than normal but not high enough yet to be diagnosed as type 2 diabetes. **Talk to your doctor to see if additional testing is needed.**

If you are African American, Hispanic/Latino American, American Indian/Alaska Native, Asian American, or Pacific Islander, you are at higher risk for prediabetes and type 2 diabetes. Also, if you are Asian American, you are at increased risk for type 2 diabetes at a lower weight (about 15 pounds lower than weights in the 1 Point column). Talk to your doctor to see if you should have your blood sugar tested.

You can reduce your risk for type 2 diabetes

Find out how you can reverse prediabetes and prevent or delay type 2 diabetes through a **CDC-recognized lifestyle change program** at https://www.cdc.gov/diabetes/prevention/lifestyle-program.

CS300699-A

Appendix F

CLIENT INTAKE FORM

ANEW-AP Client Intake Form

Contact Information

Name: _____   Date: _____

Gender (As assigned at birth): _____ Age: _____ Cell Phone: _____

Email: _____

Preferred Method of Contact (phone vs. email): _____

Preferred Time of Day to Contact (morning, afternoon, evening): _____

Please rank your agreement with each of the following statements to indicate

which healthy lifestyle changes are most important for you at this time.

At the present time, it is important for me to…	Strongly Agree	Agree	Disagree	Strongly Disagree	Does Not Apply
1. lower my health risks.					
2. make healthier food choices.					
3. increase my physical activity.					
4. improve my quality of sleep.					
5. cope better with stress.					
6. increase my overall energy.					
7. quit smoking.					

Current Health Habits: Check the responses below that best indicate your current habits in each of the following areas. If you feel a question does not relate to the goals you would like to work on with your health coach, you may leave it blank.

HEALTH RESPONSIBILITY	Always	Almost Always	Once in a While	Almost Never	Never
8. I believe I am the key to my well-being.					
9. I am under the care of a Primary Care Physician. Date of last visit:					
10. I stay current with screenings and physical exams.					
11. I take my medication(s) as prescribed.					
12. I avoid exposure to tobacco products.					
PHYSICAL WELLNESS	Always	Almost Always	Once in a While	Almost Never	Never
13. I am physically active for at least 30 minutes on most days.					
14. I drink 6-8 glasses of water each day.					
15. I eat healthy foods and drinks most days.					
16. I am limited in my activities because of a health impairment or health issue.					
LIFE BALANCE and SATISFACTION	Always	Almost Always	Once in a While	Almost Never	Never
17. I maintain a good balance between the demands of my school work, friends, family and myself.					
18. I get 6-8 hours of uninterrupted sleep each night.					

	Always	Almost Always	Once in a While	Almost Never	Never
19. I take time for fun activities.					
SOCIAL/EMOTIONAL WELLNESS	Always	Almost Always	Once in a While	Almost Never	Never
20. I have people/community that I trust & can go to for support					
21. I clearly express my needs and desires.					
22. I am knowledgeable and curious about my own well-being.					
23. I actively create a life with meaning, value and purpose.					
24. I am hopeful and optimistic about the future.					
25. I am limited in my activities because of mental health & emotional issues. (Such as feeling depressed or anxious).					
26. If under the care of a mental professional, I am current with my appointments. (if not applicable, please skip.)					
27. Does substance misuse affect your wellbeing?					
28. I enjoy new challenges and experiences					

Which healthy lifestyle changes listed above (or others) are your top 2-3 priorities right now?

1._____

2._____

3._____

Of the priorities you listed, how ready, willing and able are you to modify your lifestyle to positively impact these behaviors?

On a scale of 1-10 (1 not at all, 10 completely)

1st priority

How ready are you to change your behaviors and habits? _____

How willing are you to change your behaviors and habits? _____

How able are you to change your behaviors and habits? _____

2nd priority

How ready are you to change your behaviors and habits? _____

How willing are you to change your behaviors and habits? _____

How able are you to change your behaviors and habits? _____

3rd priority

How ready are you to change your behaviors and habits? _____

How willing are you to change your behaviors and habits? _____

How able are you to change your behaviors and habits? _____

Please provide a current medication list:

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

MEDICATION ADHERENCE	YES	NO
1. Do you sometimes forget to take your medication(s)?		
2. People sometimes miss taking their medications for reasons other than forgetting. Over the past 2 weeks, were there any days when you did not take your medication?		
3. Have you ever cut back or stopped taking your medication without telling your doctor because you felt worse when you took it?		
4. When you travel or leave home, do you sometimes forget to bring your medication(s)?		
5. Did you take all your medication(s) yesterday?		
6. When you feel like your symptoms are under control, do you sometimes stop taking your medication(s)?		
7. Taking medication every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?		

	Never/ Rarely	Once in a while	Sometimes	Usually	All the time
8. How often do you have difficulty remembering to take all your medication(s)?					

Please answer these 4 survey questions before we begin: How would you rank your nutrition/eating habits today? (1=very unhealthy, 10=excellent) _____

How many hours per week do you engage in intentional movement?

__Fewer than 5 hours

__5-9 hours

__10-14 hours

__15-19 hours

__20 or more hours

On an average day, what is your general stress level? (1=no stress, 10=extreme

stress)

_____

On an average night, how many hours do you sleep?

__Fewer than 4 hours

__5 hours

__6 hours

__7 hours

__8 more hours

__9 hours

__10 or more hours

Is there anything else you would like your coach to know about you?

_____

Appendix G

PATIENT ACTIVATION MEASURE (PAM) SURVEY

For each of the questions below, circle the response that best characterizes how you feel about this statement, where 0 = Strongly Disagree, 1 = Disagree, 2 = Neither Agree nor Disagree, 3 = Agree, and 4 = Strongly Agree.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. When all is said, and done, I am the person who is responsible for managing my health condition	0	1	2	3	4
2. Taking an active role in my own health care is the most important factor in determining my health and ability to function	0	1	2	3	4
3. I am confident that I can take actions that will help prevent or minimize some symptoms or problems associated with my health condition	0	1	2	3	4
4. I know what each of my prescribed medications does	0	1	2	3	4
5. I am confident I can tell when I need to go get medical care and when I can handle a health problem myself	0	1	2	3	4

6. I am confident I can tell my health care provider concerns I have even when he or she does not ask	0	1	2	3	4
7. I am confident I can follow through on medical treatments I need to do at home	0	1	2	3	4
8. I understand the nature and causes of my health condition(s)	0	1	2	3	4
9. I know the different medical treatment options available for my health condition	0	1	2	3	4
10. I have been able to maintain the lifestyle changes for my health that I have made	0	1	2	3	4
11. I know how to prevent further problems with my health condition	0	1	2	3	4
12. I am confident I can figure out solutions when new situations or problems arise with my health condition	0	1	2	3	4
13. I am confident I can maintain lifestyle changes like diet and exercise even during times of stress	0	1	2	3	4