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Article

Plan, Track, and Live Mindfully: Insights from the Eat Smart, Move More, Prevent Diabetes Program

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Abstract: In the United States, at least 1 in 3 adults has prediabetes, a condition categorized by blood glucose levels higher than normal but not high enough to be classified as type 2 diabetes. The CDC recommends a modest weight loss of 5-7%, a reduction in A1C by 0.2%, and at least 150 minutes of physical activity per week to prevent or delay the onset of type 2 diabetes in individuals with prediabetes. Eat Smart, Move More, Prevent Diabetes (ESMMPD) is a CDC-recognized lifestyle change program for individuals with prediabetes or at high risk of developing type 2 diabetes. ESMMPD consists of 26 lessons delivered over the course of a year by trained Lifestyle Coaches using Zoom™. Participants are taught strategies to implement health-promoting behaviors surrounding healthy eating, physical activity, and mindfulness into their daily lives. Core strategies presented throughout the program are planning, tracking, and living mindfully. Program results showed that on average, participants lost 5.1% of their body weight and reduced their A1C by 0.2%, meeting CDC type 2 diabetes risk reduction recommendations. Participants also adopted several health-promoting behaviors as a result of participating in ESMMPD. ESMMPD is an effective lifestyle change program that helps individuals with prediabetes reduce their A1C and achieve the weight lss necessary to prevent or delay the onset of type 2 diabetes.

Keywords: prediabetes; type 2 diabetes; lifestyle change program; theory of planned behavior; planning; tracking; mindfulness

1. Introduction

Type 2 diabetes is a disease categorized by high blood glucose levels and the body's inability to make enough insulin or use insulin appropriately. Individuals living with type 2 diabetes face a two-fold increased risk of all-cause mortality, along with a life expectancy eight years less than those without type 2 diabetes [1]. They also face an increased risk of developing cardiovascular disease, kidney disease, neuropathy, eye damage, skin conditions, among other complications [2]. In the United States, type 2 diabetes is the seventh leading cause of death and the most expensive chronic condition. The U.S. spends approximately 413 billion dollars annually on direct and indirect costs associated with diabetes and its complications, with type 2 diabetes consisting of approximately 90% of diagnosed cases [3,4]. Research has shown that the onset of type 2 diabetes is often preventable through appropriate lifestyle changes [5].

Prior to a diagnosis of type 2 diabetes, individuals may meet criteria for prediabetes. Prediabetes is categorized by blood glucose levels that are higher than normal but not high enough to be classified as type 2 diabetes. Those with prediabetes have an A1C between 5.7% and 6.4% [6]. Currently, in the United States, more than one in three adults have prediabetes [7]. At least 81% of those who have prediabetes are undiagnosed and unaware of the condition [8]. Without intervention, approximately

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25% of people with prediabetes will develop type 2 diabetes within three to five years, and 70% will develop type 2 Diabetes within their lifetime [9].

Prediabetes is preventable and reversible. The landmark Diabetes Prevention Program (DPP) study published in 2002, along with its subsequent longitudinal Diabetes Prevention Program Outcome studies, showed that participants in the study's lifestyle change program reduced their risk of developing type 2 diabetes by 58%. A modest weight loss of 5-7% of body weight and 150 minutes of physical activity a week were proven to delay the onset of type 2 diabetes and reverse prediabetes in some participants [5,10,11].

In response to the robust findings of this research, the United States Congress authorized the creation of the National Diabetes Prevention Program (NDPP) through the Centers for Disease Control and Prevention (CDC) in 2010. The NDPP consists of private and public partners that work to prevent or delay the onset of type 2 diabetes in the United States through the administration of lifestyle change programs [11]. In order to be considered an NDPP lifestyle change program, organizations must use either the CDC DPP curriculum, Prevent T2, or an independent curriculum that meets specific guidelines and must be reviewed and approved by the CDC. The program must be delivered over the course of one year by a trained DPP Lifestyle Coach and consist of at least 22 lessons [12].

The Diabetes Prevention Recognition Program (DPRP) was created to monitor and evaluate organizations delivering the NDPP. Organizations must apply for CDC-recognition through the DPRP and meet specific program outcomes to be awarded recognition. To maintain CDC-recognition post award, they must submit program data to the DPRP biannually to be evaluated using outcome measures that are proven to show participant risk reduction. Program data must demonstrate that at least 60% of program completers achieved any of the following outcomes at the conclusion of the program: a 5% weight loss, a 4% weight loss combined with an average of at least 150 minutes of physical activity per week, or a 0.2% reduction in A1C [13].

Eat Smart, Move More, Prevent Diabetes (ESMMPD) is a CDC-recognized lifestyle change program that focuses on healthy eating, physical activity, and mindfulness behaviors. ESMMPD received CDC preliminary recognition for 2016 to implement the program, as is standard protocol. ESMMPD was then awarded CDC Full recognition in 2020, and CDC FullPlus recognition in 2022, demonstrating its achievement of meeting specific risk reduction outcomes as determined by CDC. The program has been shown to promote weight loss, decrease A1C, increase physical activity, and improve confidence in the ability to perform health-promoting behaviors [14].

2. Materials and Methods

2.1. Development and Delivery

ESMMPD was developed in 2016 by researchers with expertise in nutrition, physical activity, and behavior change at North Carolina State University (NCSU) and the North Carolina Division of Public Health (NCDPH). It was designed as a "sister program" to the Eat Smart, Move More, Weigh Less (ESMMWL) program, which was developed by the same researchers in 2011. ESMMWL is a 15-week weight management program delivered in a real-time, online setting with the goal of educating adults on evidence-based strategies and behaviors proven to achieve and maintain a healthy weight. A randomized control trial published in 2015 found that participants who completed the ESMMWL program demonstrated a statistically significant difference in weight loss and BMI reduction compared to those in the control group on a waitlist for the program [15].

ESMMPD was designed as an independent curriculum in accordance with the NDPP requirements to serve adults with prediabetes or who meet certain risk criteria for developing type 2 diabetes. The ESMMPD curriculum drew on the success of the ESMMWL curriculum and includes many of the same evidence-based strategies to achieve and maintain a healthy weight. The ESMMPD study was reviewed and approved by the Institutional Review Board of NC State University (protocol number 26007).

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The ESMMPD program focuses on three core concepts: planning, tracking, and living mindfully. Over the course of 12 months, participants attend 26 lessons which cover lifestyle-change topics proven to help prevent or delay the onset of type 2 diabetes. Participants gain an understanding of why specific behaviors contribute to specific outcomes, such as weight loss. As they learn the "why," they are also taught the "how," and are provided with necessary tools and resources to implement these behaviors into their daily lives, with the long-term goal of forming life-long habits. During the entirety of the program, participants receive weekly one-on-one support from their Lifestyle Coach outside of class, as well as communal support from their cohort of classmates. Throughout the 12-months, participants receive accountability, encouragement, and acknowledgement of both struggles and successes and therefore gain confidence in the small steps taken to prevent or delay type 2 diabetes.

2.1.1. Theory of Planned Behavior

ESMMPD was designed using the Theory of Planned Behavior which focuses on the intention preceding a specific behavior. It outlines three types of beliefs an individual may have that influence their intention to perform a certain behavior. The first is behavioral beliefs, or personal attitudes toward the behavior. In order to perform a behavior, an individual needs to have a positive attitude towards the behavior and believe that it will help them reach their goals. The next is normative beliefs, or the perceived attitudes of peers or respected others towards the behavior. Normative beliefs are addressed in the program by the presence of a cohort of classmates and a trusted guide, their Lifestyle Coach. Lifestyle Coaches build rapport with their participants while simultaneously demonstrating their knowledge and expertise related to healthy eating and physical activity behaviors. Participants see that their Lifestyle Coach has positive beliefs towards these behaviors, and because they have built a positive rapport and respect, they are influenced to consider adopting the same beliefs and attitudes towards the behaviors. The final is control beliefs, or an individual's perceived power to perform the behavior. The more confident and equipped an individual feels to perform a behavior, the more likely they are to perform it [16]. The lifestyle-change strategies presented throughout ESMMPD target these three types of behavioral beliefs to promote positive behavior change.

2.2. Delivery Model

ESMMPD is delivered by trained Lifestyle Coaches, the majority of whom are Registered Dietitian Nutritionists. Lessons take place using the synchronous distance technology of the Zoom™ platform. Participants meet at the same time for each of the 26 lessons with the same cohort of classmates. Each lesson is one hour long. The beginning of each lesson starts with a reflection on the previous week's topic in which participants are encouraged to share their struggles and successes.The Lifestyle Coach then shares and presents slides containing information about a specific topic in an engaging, interactive format that includes visuals. Participants are encouraged to use the chat box to answer or ask questions during the lesson and are given opportunities to unmute their microphones as well. At the end of the lesson, participants are provided with several options for relevant behavior change strategies and encouraged to select one to focus on and implement prior to the next class.

2.2.1. Curriculum Timeline and Lessons

The program is delivered in two parts over the course of a year: Phase 1 and Phase 2. The timeline, including the titles of each lesson, is shown in Image 1. Phase 1 is the first six months of the program in which participants meet for class weekly or every three weeks for 18 lessons. During Phase 1, participants learn basic skills such as how to read and interpret food labels, measure portions appropriately, and recognize added sugars. Participants also take an audit of their daily routines. New daily habits are established with consistent opportunities for questions and feedback. In accordance with the Theory of Planned Behavior, a strong emphasis on motivation is placed within

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the beginning lessons, with encouragement to make the motivation personal and specific. For example, instead of a participant's motivation being, "to lose weight," they would be encouraged to think about the "why" behind that. Their motivation then might become, "I want to lose weight so that I have less joint pain and can play with my grandkids more actively." Having a rewarding, personal image to focus on and work towards increases motivation and commitment.

Phase 2 is the following six months, in which lessons are less frequent with three and then four weeks in between each lesson. Only participants who attend at least 9 out of 18 Phase 1 classes are permitted to proceed to Phase 2 of the program. By the time participants reach Phase 2, they are likely to have begun to see positive outcomes from changes they have made and have received positive feedback from their Lifestyle Coach. They also have identified their personal challenges and found ways to troubleshoot problem areas, building self-efficacy. In Phase 2, there are larger gaps of time between lessons so participants can continue to build self-efficacy by implementing and staying consistent with healthy behaviors on their own during off-weeks. Lifestyle Coaches continue to check in with their participants and participants are encouraged to continue to track their weight, physical activity, and strategies on off-weeks. Phase 2 lessons place an emphasis on maintenance and dive deeper into topics that were covered in Phase 1.

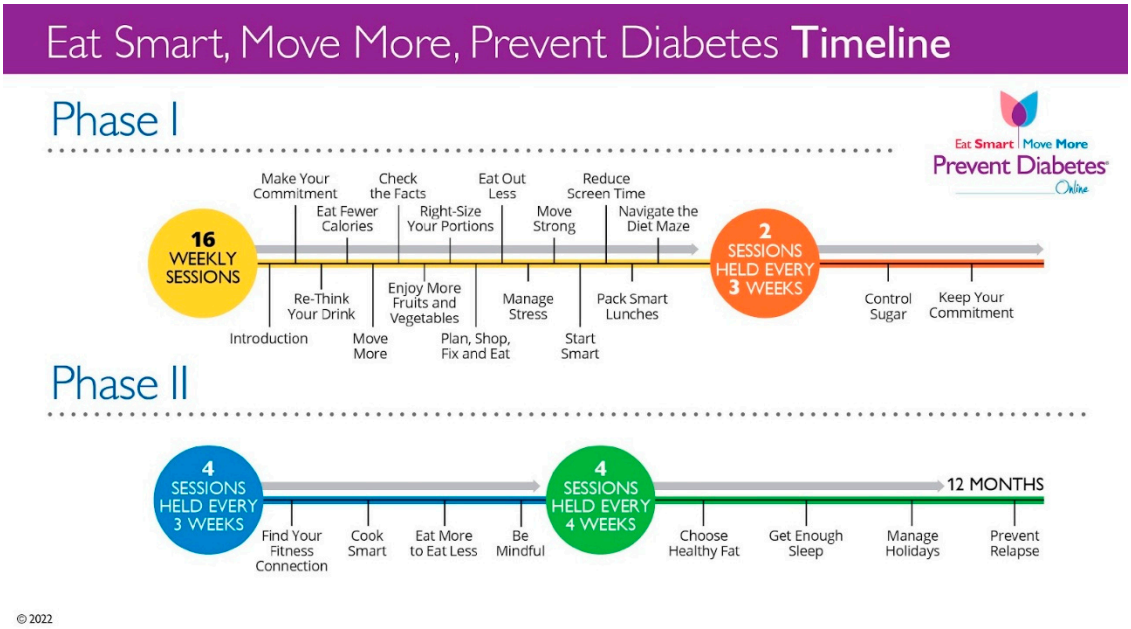

Image 1.

2.3. My Progress Portal

Participants have access to a secure, online platform called the My Progress Portal (portal), which was designed and developed by the research team and web developers specifically for ESMMPD. The portal is also used by the Lifestyle Coaches and the program administration team. Within the portal, Lifestyle Coaches send participants group messages with lesson recaps and a Zoom recording link that participants can watch for make-up attendance credit if they missed class. Lifestyle Coaches also send personal weekly messages to all participants individually, celebrating their wins and encouraging them to meet their goals. Participants are able to send a message to their instructor within the portal at any time to share updates or ask questions.

At the beginning of the program, participants set a "SMART goal", which remains displayed on the participant homepage of the portal throughout the program. SMART goals are Specific, Measurable, Attainable, Realistic, and Timely. Lifestyle Coaches guide participants on setting an appropriate SMART goal and check in with them throughout the program on their progress toward meeting their goal. About halfway through the program, participants are encouraged to re-evaluate

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their SMART goal to determine if they still find it appropriate. If not, they are encouraged to set a new, or modified, SMART goal. The prompting of mid-point reevaluation is important as it demonstrates that progress is not always linear, and it gives participants the opportunity to practice adjusting and adapting when necessary, as opposed to quitting when discouraged or stuck.

The portal also provides a structured format for participants to track progress on their weekly strategies and "non-scale" victories. Each week, participants are encouraged to enter their weight and physical activity minutes. On the portal homepage, participants see a weight tracker line graph charting their progress throughout the program. This graph indicates the 5% weight loss goal weight, giving participants a visual representation of how close they are to reaching this goal. They have the option to weekly track A1C (if they have had it re-tested during that week) and average daily steps. Participants are given the option to track other evidence-based strategies in the portal as well. The tracking page asks, "On how many days of the week of this report did you___?" where participants record the number of days they performed any of the following strategies: eat breakfast, eat at least 2 cups of vegetables, eat at least 1 cup of fruit, choose healthy fats, control portion sizes, prepare and eat meals at home, watch 2 or fewer hours of TV, limit the amount of screen time, drink 1 or fewer sugar-sweetened beverages, participate in at least 30 minutes of physical activity, participate in strength training, get at least 7-9 hours of sleep, and manage stress. They also have the option to create a custom strategy they would like to track weekly. Lifestyle Coaches are able to view their participants' entries and are expected to send them messages celebrating any progress they notice in their participants' tracking. Participants are able to view each of their previous entries and notice their progress over time, reinforcing the positive behavior-change feedback loop.

Participants are encouraged to use other tracking methods supplemental to the portal that they find helpful. At the beginning of the program, participants have the option to request a print copy of an ESMMPD "Mindful Eating Journal" which contains a structured tracking outline for each day of the week. A "My Week Ahead" page starts the week where participants track their current and goal weight and physical activity minute average. There is also a space for them to record the strategy they are working on for that week, as well as a personal motivation for the week and a non-food reward for achieving their goals. Each following day of the week then contains an open-ended food journal in which participants can write what they have eaten for breakfast, lunch, dinner, and a prompt to record whether they ate mindfully for that meal. They can also record snacks, fruit and vegetable intake, number of hours of sleep, and physical activity or exercise. At the end of each week, there is a page providing a structured reflection for how participants planned, tracked, and ate mindfully that week, as well as a list of strategies they can check "yes" to accomplishing that week. It is acknowledged that if participants would prefer to track their food intake or calories in one of the many smartphone apps designed to do so, they are welcome to do so.

3. Results

Participant data were collected from program registration forms, participants' weekly data entry in the portal, and optional end-of-program evaluation surveys. From January 2019 through January 2024, 254 synchronous distance technology classes were launched and 3,172 participants enrolled and consented to sharing their data for research purposes. 1,740 participants completed the program. Program completion is defined as attending at least 9 out of 18 classes in Phase 1 and at least 3 out of 8 classes in Phase 2.

The average participant age was 55 years old, with ages ranging from 18-88 years old. 88% of participants identified as female and 12% identified as male. When reporting race/ethnicity, participants could select all options that applied. 69% of participants identified as Caucasian/White, 26% identified as African American or Black, 4% identified as Hispanic or Latino, 2% identified as Asian, 2% identified as Native Hawaiian or Pacific Islander, 1% identified as American Indian, and 2% preferred not to say.

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Participants (n=1,487) entered a beginning and ending weight in the My Progress Portal. On average, participants lost 11.1 lbs. and 5.1% of their body weight, meeting the CDC weight loss recommendation for type 2 diabetes risk reduction.

The following data were collected from optional end-of-program evaluation surveys distributed to participants via SurveyMonkey™. The survey assessed beginning and ending biometrics, strategies and behaviors adopted as a result of the program, and general program feedback.

694 participants entered their beginning and ending A1C, and on average, reduced their A1C by 0.2%, meeting the CDC A1C reduction recommendation for type 2 diabetes risk reduction.

Participants answered "yes", "no", or "I was already doing this" to performing certain health-promoting behaviors as a result of the program. All behavior questions were optional. Results are shown in Table 1.

Table 1. Participants reported adoption of health-promoting behaviors as a result of participating in ESMMPD.

Behavior	Yes	No	I was already doing this
Am physically active at least 30 minutes most days (n=1,135)	70 %	12 %	18%
Eat fewer calories (n=1,126)	90 %	7%	3%
Prepare and eat more meals at home (n=1,125)	67 %	4%	29%
Eat 2-3 cups of vegetables most days (n=1,114)	77 %	10 %	13%
Am more mindful of what and how much I eat (n=1,118)	96 %	1%	3%
Am more mindful of getting physical activity each day (n= 1,124)	90 %	4%	6%
Manage Stress (n= 1,115)	71 %	13 %	16%
Prepare for holidays and travel (n=1,074)	86 %	8%	6%

4. Discussion

Program outcomes demonstrate that ESMMPD is an effective intervention for individuals with prediabetes seeking to delay or prevent type 2 diabetes. On average, participants lost 5% of their body weight and reduced their A1C by 0.2%, achieving the weight loss and A1C reduction recommended by the CDC for risk reduction of type 2 diabetes. Participants successfully adopted health-promoting behaviors related to physical activity, healthy eating, and mindfulness as a result of participating in ESMMPD. Results reflect the ways in which the core concepts of planning, tracking, and living

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mindfully were utilized to achieve weight loss, A1C reduction, and the adoption of health-promoting behaviors.

4.1. Planning

A 2020 behavioral weight loss intervention study showed that higher meal planning frequency was associated with greater weight loss [17]. In ESMMPD, participants learn various strategies to promote increased and successful meal planning. For example, in lessons 2 and 9, participants learn how to keep their refrigerator, freezer, and pantry stocked with healthy staple items. They are encouraged to plan what, where, and when they eat, so that eating patterns are not impulsive, on-the-go, and random. They are also encouraged to grocery shop with a detailed list of ingredients needed to make nutritious meals and snacks, so that the shopping cart is not filled with impulsive choices of what might look most appetizing at that moment. When it comes to planning meals and snacks, participants are encouraged to keep it simple, and are provided with recipes that are easy to make and nutritious. Program results demonstrate the effectiveness of these planning strategies, as participants (67%) reported preparing and eating more meals at home as a result of participating in the program.

Participants are encouraged to use planning as a strategy to increase physical activity as well. As indicated in the Theory of Planned Behavior, intention precedes action, including when it comes to physical activity. Research has shown that two types of planning, referred to as action planning and coping planning, help bridge the gap between the intention of doing activity and the action of doing activity. Action planning involves knowing where, when, and how an individual will initiate a behavior, in this case, physical activity. Coping planning involves anticipating barriers that may interfere with performing a behavior and awareness of behaviors that can be implemented to offset or overcome said barriers [18,19].

Participants learn how to practice action and coping planning in lesson 9 of the curriculum. They are encouraged to plan time for exercise and create a block in their calendar as they would for an appointment or other activity. Plans are encouraged to be specific, so that instead of writing, “7pm: exercise,” in a calendar, participants would think ahead of what kind of exercise they plan to do and where they plan to do it, and for instance, write, “7pm: elliptical machine and hand weights at the YMCA”. This is considered action planning. Participants are taught to plan ways to build physical activity into their daily lives, such as taking stairs instead of an elevator, or walking instead of driving to complete a nearby errand. They are also encouraged to consider barriers that may arise in their plan and think of alternative options, i.e. practice coping planning. Coping planning can be as simple as “if-then” statements, for example, “I plan to walk for one hour around the neighborhood after work today. The forecast shows it might rain. If it is raining, then I will walk for one hour on the treadmill instead of outside, and listen to my favorite podcast while doing so to make it more enjoyable.”

In lesson 1, participants are shown a CDC-suggested five-step problem solving framework that can be used throughout the program to practice coping planning for challenges they may encounter with healthy eating and physical activity. These five steps are: 1. Describe the problem, 2. Brainstorm options for solving the problem, 3. Pick one option to try, 4. Make a positive action plan to put the chosen option into effect, and 5. Try it [20]. A framework with actionable steps to follow allows participants to think logically through the problem and create a plan to solve it, which increases personal control, or perceived power, beliefs. If participants find success using the model, perceived-power is increased. They have learned that when faced with a challenge, they have a reliable framework to help them overcome it. By learning how to plan and how to effectively problem-solve planning challenges, participants gain a better understanding of how to turn their intention into action and develop self-efficacy as they do so.

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4.2. Tracking

A growing body of research demonstrates the significance of consistent tracking in relation to weight loss. In an online intervention weight loss study, participants who consistently tracked their dietary intake at least five days a week had significantly greater success towards weight loss and sustaining weight loss compared to those who tracked inconsistently or rarely [21]. From a social-ecological perspective, tracking is an effective strategy towards healthy behavior change because when structured effectively, it creates an environmental cue or reminder of said behaviors. In ESMMPD, tracking in the portal and mindful eating journal serves as an environmental cue of the outcomes and behaviors participants seek to achieve. Lifestyle Coaches also send messages in the portal to remind participants to track and monitor their tracking to provide feedback and encouragement. When a participant is stuck in a plateau, the first behavior that is suggested by Lifestyle Coaches is to track. Additionally, tracking health outcomes and behaviors provides knowledge. The portal allows participants to notice patterns and progress in the data they track throughout the program, which can provide insight on required action [22,23]. When positive changes in behavior or outcomes are observed due to longitudinal tracking, the feedback loop surrounding the behavior change is reinforced positively, promoting continued or increased action towards the behavior change [24].

The design and format of tracking evidence-based strategies weekly in the portal provides not only knowledge, but also serves as a mindfulness and problem-solving exercise for ESMMPD participants. Asking, "On how many days of the week of this report did you___ ?" allows participants to broadly reflect on their week. For instance, if they notice that they only ate 2-3 cups of vegetables 3 days this week, but ate 2-3 cups of vegetables 6 days the previous week, they have an opportunity to reflect on what was different this week compared to the previous week. What barriers prevented them from eating 2-3 cups of vegetables on the days they did not? Once this is identified, they are able to problem solve how to overcome those barriers for the following week.

4.3. Living Mindfully

Previous research has shown mindfulness to be an effective strategy to prevent type 2 diabetes. Participants who took part in a mindfulness-based risk reduction education program for prediabetes experienced significant reductions in BMI, perceived stress, and daily caloric and carbohydrate intake when compared to participants who participated in a conventional risk reduction education program for prediabetes at 3-months follow up. They also reported an increased awareness of stress and an increased consciousness of eating mindfully, compared to the conventional program control group [25].

Consistent with the Theory of Planned Behavior, ESMMPD promotes mindful living as a tool to help participants become aware of the behavioral beliefs and attitudes they have towards specific health-promoting behaviors. Awareness then provides the possibility to evaluate how beliefs and attitudes towards a specific behavior influence their intention to perform it. With guidance from their Lifestyle Coach, participants learn to reframe beliefs and attitudes in ways that increase their motivation to perform the behaviors conducive to the achievement of their goals.

Phase 2 of the program contains a lesson focused solely on mindfulness and how it can be applied specifically towards goals of losing weight and increasing physical activity. Participants are given examples of how to intentionally practice mindfulness and stress reduction, such as with meditation, or mono-tasking, as opposed to multi-tasking. Participants are also taught to cultivate general awareness of their body, feelings, and environment and practice non-judgement surrounding what they notice. As a result of participating in ESMMPD, 96% of participants reported being more mindful of what and how much they ate, and 90% reported being more mindful of getting physical activity each day, demonstrating increased mindfulness in daily life.

Mindful eating specifically has been shown to improve blood glucose regulation. This is achieved through various direct and indirect mechanisms of action, such as eating slowly and according to hunger and satiety cues [26]. ESMMPD places an emphasis on mindful eating

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throughout the curriculum. Participants learn what mindless eating is and the many cues, whether external and environmental, or internal and physical, emotional, or cognitive, that contribute to it. Various practices are discussed to help transition from mindless to mindful eating. Examples include thinking about why you are eating, thinking about the taste, feel, and smell of the food you are eating, and being aware of hunger and satiety cues. Participants are also shown a hunger scale to use as a resource when practicing mindfulness of hunger and satiety cues. They are encouraged to brainstorm areas in their lives where they can eat more mindfully; for instance, making eating an exclusive event instead of eating while watching a screen, scrolling on social media, or working at a desk. Mindfulness-based interventions have also been shown to improve blood glucose regulation by decreasing measures of depression, anxiety, and general psychological distress, including diabetes distress [27].

In addition to mindful eating, participants are shown strategies on how to practice mindfulness related to physical activity. One such strategy is having awareness of where more movement can be incorporated into daily life, such as going for a short walk around lunch time or getting up to move every hour when sitting for long periods of time. Another is thinking about how they feel during and after any given exercise, and choosing forms of exercise they find enjoyable. The recognition of positive feelings associated with an activity positively reinforces the behavior-change feedback loop.

4.4. Limitations

This study was not an experimental design and as such cannot prove that program outcomes were a direct result of the program; confounding variables were not accounted for. Participants in the study were predominantly female (88%). Biometric data in the study were self-reported. Participants also reported their data via digital formats such as the portal and the end-of-program evaluation survey. While designed for user ease and accuracy, human error may have occurred in self-reporting.

4.5. Future Implications

Insights gleaned from the ESMMPD program can influence future research, funding, and program implementation surrounding type 2 diabetes prevention. While a body of research exists examining the effectiveness of planning, tracking, and living mindfully as health promotion strategies, more research is needed on including these strategies in community based interventions for individuals with prediabetes. Similarly, because 88% of the sample size identified as female, more research is needed to understand how male-identifying participants respond to the program. The study should be repeated with an experimental design to indicate a causal relationship.

The effectiveness of ESMMPD in meeting CDC risk reduction requirements to reduce risk of type 2 diabetes demonstrates the need for expanded funding for community based DPPs, including those recognized by the CDC NDPP. With type 2 diabetes remaining the most expensive chronic condition in the United States, more dollars should be invested in prevention to reduce the 413 billion dollars spent annually on direct and indirect costs associated with diabetes and its complications. Even modest decreases in the number of people developing type 2 diabetes would translate into large health care cost savings [3].

Aspects of ESMMPD implementation, including the use of synchronous distance technology, should be considered during implementation research for other DPPs. Synchronous distance technology is an effective delivery model that promotes program accessibility and reach [28]. The use of an online participant portal for participant tracking and participant and Lifestyle Coach communication should also be considered to promote participant engagement.

5. Conclusions

Eat Smart, Move More, Prevent Diabetes is shown to decrease weight and increase physical activity consistent with decreasing risk of developing type 2 diabetes. The program delivery and

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curriculum designed using the Theory of Planned Behavior were successful in changing participant behaviors. Planning, tracking, and living mindfully were core strategies used to influence behavior change. Implementation of Eat Smart, Move More Prevent Diabetes and similar DPPs improve health outcomes, prevent or delay the onset of type 2 diabetes, and have great potential to decrease health care costs.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study cannot be shared due to IRB regulations.

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