

Move to Improve

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Author's Note

Roby Cherian is a student at Edson College of Nursing and Health Innovation, Arizona State University. I have no known conflicts of interests to disclose.

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Abstract

Obesity is a complex public health concern. According to Harvard and George Washington University public health researchers, by 2030, half of the United States population will be obese, and one fourth of adults will be severely obese . Lifestyle modifications are the cornerstone of managing obesity. Even with increased awareness, inactivity is expected in the adult population . Primary care providers can integrate the Health Belief Model in encouraging their patients to be physically active. **Methods:** ‘Move to Improve’ is a multi-modal intervention that incorporates educational sessions by healthcare professionals and a personal trainer along with motivational calls encouraging participants to engage in physical activity. The project recruited patients at a primary care clinic between 18- 69 years of age with a body mass index (BMI) of greater than 25. This project compared physical activity of the participants, before and after intervention, using the International Physical Activity Questionnaire. **Results:** The data was analyzed using descriptive statistics, two tailed paired t-test and Wilcoxon signed rank test. Post-intervention total physical activity levels increased ($p=0.022$), and body weight decreased ($p=0.002$) compared to pre-intervention. **Conclusion:** Move to Improve is an intervention that can be utilized by primary care providers to assist patients at risk for obesity and encourage them to incorporate an active lifestyle.

Keywords: Obesity, physical activity, Health Belief model, International Physical Activity Questionnaire

Move to Improve

Obesity is a complex, multifactorial disease, and a growing public health concern. According to Harvard and George Washington University public health researchers, by 2030, nearly half of the United States population will be obese, and nearly one out of four adults will be severely obese (Healy, 2019). Nineteen states in America have an obesity rate greater than 35%, but a decade ago; no states had this rate (Trust for America's Health, 2022). The rate of obesity has doubled globally since 1980, and one-third of the world's population is obese or overweight (Lin & Li, 2021). Approximately 50 % of the world's population will be obese by 2030 (Ward et al., 2019). The drastically increasing numbers are alarming in both developed and developing countries. It is essential to encourage the adult population to exercise and stay active with activities that are relatable and entertaining at the same time. The healthcare team must develop a plan that addresses the patient's needs to prevent people from falling out of their daily activity routines, considering their busy schedules and daily commitments (Cavallini and Dyck, 2019).

Overweight and Obese Population

Physical inactivity is highly prevalent, especially in overweight and obese adult populations (Ward et al., 2019). Baillot et al. (2021) summarized that the most frequent intention for physical activity is weight management. Exercising will promote weight loss and helps to prevent weight regain. The obese population faces various obstacles to physical activity, such as a lack of motivation, self-discipline, time, interest, energy, and exercise equipment (Baillot et al., 2021). Sedentary behavior is a difficult habit to overcome, confirmed by the fact that even people with free time and access to resources may not be motivated to exercise (Rebar et al.,

2019; Cavallini and Dyck, 2019). It is essential to find interventions that encourage people to meet activity recommendations. (Baillot et al., 2021; Jakicic et al., 2018).

Lifestyle modifications are the cornerstone of managing obesity among the population, and it is essential to develop a systems approach to solve this issue. Even with increased awareness and knowledge about the benefits of physical activity, physical inactivity is observed in the adult population (Baillot et al., 2021; Guedes-Estevez, 2021). Most adults do not engage in the recommended 150 mins per week of physical activity because of a lack of motivation and time (Guedes-Estevez, 2021). Some individuals overestimate their physical activity level, and they tend to believe that physical activity is less beneficial and have no intention to increase their activity level compared to others (Islam et al., 2021). Organizations at community, state, national and international levels have been focusing on curbing obesity numbers, but the progress has been plodding, and in fact, the numbers have been drastically worsening globally despite the efforts.

Local/ National Initiatives

With the disturbing increase in the burden of disease caused by obesity, health organizations are making active efforts to reduce obesity in the community. The United States Preventive Services Task Force (USPSTF) recommended adding routine screening for obesity as well as behavioral counseling and pharmacotherapy for weight loss and weight loss maintenance. The USPSTF guidelines recommend that a primary care provider should promote adherence to a reduced calorie diet and physical activity goals through regular telephonic or in-person sessions per year (Tronieri et al., 2019).

The World Health Assembly (WHA) has developed a voluntary plan of action called the Global Action Plan on Physical Activity (GAPPA) 2018-2030 to reduce the growing level of

physical inactivity in the world population (Bull et al., 2020). The target is to reduce inactivity in adults and adolescents by 15% by the year 2030 (Bull et al., 2020). The WHO recommends that any amount of physical activity done during work, household chores, leisure, and transportation counts towards the recommended activity time of 150 minutes of moderate to vigorous activity per week (Bull et al., 2020). These recommendations require individual countries to develop policies to promote public awareness and programs to integrate physical activity into every individual's life. It requires increased opportunities at workplaces, schools, and communities, to stay active. The U.S. Government has made efforts to combat obesity in the last decade by imposing a tax on sugary beverages and developing safe environments including walkways, trails, and parks for cycling and walking (Chalhoub et al., 2018). Recent data suggests that the National Initiative of Healthy People 2030 aimed at reducing the proportion of adults with obesity has been experiencing a worrisome trend (Trust for America's Health, 2022). The state and the federal government are making obesity prevention policies like making strong healthy food policies, building safe communities, promoting health care providers for increased screening and treatment for obesity (Cleveland et al., 2022; Chalhoub et al., 2018).

Healthcare professionals at the primary care level have an essential role in encouraging their patients to be physically active. Long-term weight control can be achieved by increasing physical exercise and therapeutic patient-practitioner interaction (Lin & Li, 2021; Cunningham & O'Sullivan, 2021). Healthcare providers must work with other professionals like health coaches, nutritionists, and personal trainers to promote physical activity in the population (Jones et al. 2019). Studies have been conducted using various methods that can be utilized for physical activity promotion. Exercise counseling, setting small goals, computer-based or web-based

interventions, health coaching, and social support, especially by their family, enhances patients' participation in developing an active lifestyle.

Internal Evidence

OPC is a primary care clinic in the southwestern U.S. that provides medical services to patients across the lifespan, including preventive healthcare, annual wellness, and routine physical exams. They manage a myriad of acute and chronic conditions and strive to provide professional and quality healthcare to patients. Observation performed at the primary care clinic revealed that approximately 60 % of the population were overweight, if not obese with high BMI levels, with multiple chronic conditions and were not adequately exercising. The primary care clinic had no process to support these patients to help them achieve their activity goals. This project aimed to encourage these patients to be active and provide them with the support they need to achieve their health goals.

OPC is a busy practice, providers are unable to spend adequate time with the patients and help them make realistic goals to maintain physical activity to support their personal as well as national objectives to curb obesity. The practice tracks the Healthcare Effectiveness Data and Information Set (HEDIS) score, a health improvement tool utilized at the clinic. But the score does not have a specific measure for obesity. The practice staff finds that the population they serve suffer from chronic problems that may benefit from having a good exercise routine and need help implementing that at the practice. A preliminary assessment of the patients at the facility showed a lack of motivation to exercise, and the reasons were unfavorable weather conditions, not enjoying exercise, lack of time, and depression from losing a partner. Having a routine exercise support program provided by the practice would help patients comply with physical activity goals. Developing such a program was vital for the project site as it would

improve their overall performance in a competitive society and improve customer reviews and patient satisfaction.

PICOT Question

A review of the literature led to the clinically relevant PICOT question: “Among obese and overweight adults in a primary care practice, how does a structured physical activity support program compared to standard care promote active lifestyle and maintenance of healthy BMI.” and led to the following exhaustive search.

Search Strategy

A literature review was projected to identify the various interventions studied in a primary care setting to promote an active lifestyle among patients with obesity. The three databases searched were CINAHL, PubMed, and Cochrane Library. The studies that resulted from the search in these databases were highly relevant to the PICO question. Ten studies were explicitly incorporated for detailed review, all of which were randomized control trials (RCTs).

Keyword Selection

Within all databases, the components of the PICO question were captured using various vital terms and their combinations. The terms used for the population search were *obese, obesity, overweight, adults with unhealthy BMI, and excessive weight*. The intervention search terms included *exercise, physical activity coaching, or lifestyle intervention*. The terms used to search the setting were: *primary care setting, primary care clinic, or primary care*. Filters were placed to limit the studies to the English language and studies published from 2018 to 2023. Mesh and Boolean terms were used to broaden the search and increase the possibility of finding an appropriate study. The titles and abstracts of studies from searches that yielded under 50 results were reviewed for relevance to be included in the detailed literature review.

Initial and Final Search Yields

The CINAHL database was searched with the aforementioned key terms. Results ranged from two to hundred seventy-four with the various combinations of the keywords. Different combinations of the key terms for the population, intervention, and setting were placed each time to limit the results and make the search more specific. One search result with the following mesh terms of *exercise or physical activity coaching, overweight or obese older adults, and primary care setting* yielded 103 results. The PubMed database was searched with a narrower keyword search that included *overweight or obese adults, physical activity support programs, primary care, and Healthy BMI*. This search yielded 99 results. Other combinations of the key terms were tried along with time and language filters, and the results produced were between two and forty-one articles. The Cochrane Library was searched for relevant studies. The initial search with the following combination of *obese or overweight adults, structured exercise program, primary care, and active living* without the time filter yielded 14203 results. Additional filters were applied, and different combinations of key and mesh terms were tried. The final search results ranged from two to 20750 articles.

The titles, abstracts, and publication dates were reviewed for relevance to the PICO question. Approximately 100-150 article abstracts were scanned to identify the best 43 studies, and a rapid critical appraisal checklist was completed to identify the most relevant ten randomized control trials (RCT) (Appendix A, Table A1).

Limitations, Inclusion, and Exclusion Criteria

Inclusion criteria included studies specific to the primary care setting, the adult population with overweight or obesity, and studies published between 2018-2023. The inclusion criteria consisted of studies in the English Language. The studies conducted in the hospital

setting, a population that included adolescents and children, and a lower level of evidence with missing parts were excluded from the exhaustive search.

Critical Appraisal and Synthesis of Evidence

The critical appraisal method of quantitative evidence by Melnyk and Fineout-Overholt (2019) was utilized to determine which studies can be retained to answer the clinical question and help make clinical decisions for the population being studied. The final 10 studies included in the search for evidence were all RCT's with minimum bias and high-quality evidence published within the last five years (See Appendix A, Table A1). This demonstrates homogeneity and level two evidence across all studies. All studies identified strategies that help motivate the obese and overweight population in a primary care setting to lead an active lifestyle.

The average age of the participants ranged from 40-57 years of age, with a predominance of the female population in most of the studies. Sample sizes were adequate, ranging from 200-800 participants, except for one study having a sample size of 2000 participants (see Appendix A, Table A2). The attrition rate in these trials was moderate to high due to reasons that have not been investigated. Sixty percent of the studies were conducted in the United States, and 100% were in the primary care setting. Structured education and behavioral lifestyle support delivered by health coaches are the most studied techniques in primary care and display positive outcomes. Other interventions such as goal setting, task cards, financial incentives, social support groups, and self-paced online support are also studied with positive impact.

Approximately sixty percent of studies included body weight and waist circumference as variables to evaluate the effectiveness of the interventions (see Appendix A, Table A1). Physical health status, well-being, step count, sitting time, minutes of physical activity, and increased knowledge were other variables included in the trials. One of the studies studied the effect of

telephone coaching in engaging participants in modifiable cardiovascular risk reduction programme. The telephone coaching intervention increased participation by 51% in the intervention group compared to 29% in the control group ($p < 0.0001$, CI 95%) but did not show a significant decrease in cardiovascular risks at six months (Oddone et al. 2018). All the studies that included body weight and waist circumference as a variable showed a decrease in the short-term follow-up, but the change was slow and negligible in the long-term follow-up time of 12 and 24 months (see Appendix A, Table A1).

Discussion of Evidence

Living an active lifestyle has many benefits, and there is convincing evidence to support this. Studies have been undertaken to investigate strategies to promote and encourage individuals to live an active life. Programs that are intended to motivate obese and overweight adults to increase their level of physical activity were reviewed. (see Appendix A, Table A1). Multi-modal behavior interventions that incorporate education sessions about physical activity, diet, benefits of physical activity, and identification of the cardiac risk and risk of diabetes are common strategies to motivate patients. Knowledge of the risk and benefits empowers the patients to make informed decisions to further add exercise to their daily routine. Women have been more motivated to participate in the programs, possibly due to the prospect aspect of weight loss. Body image can play a vital role in motivating individuals to stay active. The attrition rate in the presented evidence is moderate to high and has not been adequately investigated, however lack of motivation and time is likely a contributing factor. Thus, constant support and structure that aligns with the patient's needs must be developed to promote compliance.

The average age of participants is between 40-57 years of age, it can be postulated that individuals of this age group have a higher tendency to develop obesity and complications

related to obesity. It is difficult to see a meaningful change in the anthropometric measurements over a brief period. The studies showed that the progress slowed, as shown in the long-term follow-up. Thus, interventions need to be delivered for a more extended period to keep patients motivated. The follow-ups must be regular to encourage patients to comply with the program. Telephonic follow-ups and online access to helpful content may reduce the patient's burden of traveling to the clinic. This aligns with the need of the project site to encourage patients with multiple comorbidities, who are middle aged adults to adopt the habit of active lifestyle. Active lifestyle eventually helps patients to be metabolically healthy, reduce medication dosages, avoid complications from their medical conditions and meet their health and body image goals in the long term.

Theoretical Framework

The project is built on the concepts of the Health Belief Model (see Appendix B). It is one of the most widely used frameworks on health behavior. It was developed by a group of U.S. Public Health Service social psychologists, Hochbaum, Rosenstock, and others, to understand the reason for low participation in the various health programs offered to detect and prevent diseases (Butts & Rich, 2018). Psychologists theorized that an individual's awareness of their susceptibility to disease and their perception of trying to prevent disease influences the willingness and motivation to act (Butts & Rich, 2018). The Health Belief Model theorizes that when the patients are educated about their susceptibility to developing diabetes and cardiovascular disease and that physical activity has the potential to prevent disease, they will increase their daily physical activity.

The Health Belief Model has six main concepts: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action., and self-efficacy (Washburn,

2020; Butts & Rich, 2018). Perceived susceptibility is when the person understands that they are at risk of developing a disease for them to take action to prevent disease (Washburn, 2020; Butts & Rich, 2018; Khodaveisi et al., 2021). Educating the patients about the potential complications of being overweight and obese and the risk of developing diabetes, cardiovascular conditions, musculoskeletal conditions, and cancer will prompt the patients into action. The 'Move to Improve' intervention includes sessions with health professionals explaining obesity, potential complications, and ways to prevent these complications. Perceived severity is when the person recognizes the extent of their disease, driving them to act (Washburn, 2020; Butts & Rich, 2018; Khodaveisi et al., 2021). 'Move to Improve' will allow the participants to clarify their doubts with a healthcare professional about how physical activity can benefit their condition. Perceived benefits refer to when the person realizes that the new behavior will reduce the consequences of their condition (Washburn, 2020; Butts & Rich, 2018; Khodaveisi et al., 2021). Knowing how physical activity affects and maintains their overall health will motivate them to continue to pursue physical activity in their daily routine (Baillot et al., 2021; Petridou et al., 2019). The project intervention will allow opportunities to learn the benefits of physical activity from healthcare professionals and a personal trainer. The personal trainer will provide safe exercise based on the patient's preference and physical limitations. Perceived barriers refer to the obstacles that hinder the new behavior change, and it is essential to identify them for the new behavior to be adopted (Washburn, 2020; Butts & Rich, 2018; Khodaveisi et al., 2021). The barriers to the project can be lack of time, the belief that physical activity requires complex equipment, and perceived fatigue and lack of energy. The project intervention will focus on providing tips to accommodate physical activity into their daily routine and resources available in the community. "Cues to action" is another model concept that can be beneficial and boost

changing behavior (Washburn, 2020; Butts & Rich, 2018; Khodaveisi et al., 2021). The 'Move to Improve' intervention involves providing the participants with two motivational calls per week as a reminder to meet their activity goal. Self-efficacy is the final concept of the Health Belief Model, which is the perception of one's ability to do something (Washburn, 2020; Butts & Rich, 2018; Khodaveisi et al., 2021). Patients need to feel capable of performing and sustaining the new behavior. The knowledge and support gained through the 'Move to Improve' program will boost the participants' self-efficacy and equip them to maintain an active lifestyle. Health Belief Model perfectly guides the project that involves a health behavior change, and concepts of the framework provide clarity to the project. The evidence supports the importance of physical activity for the obese and overweight population; thus, incorporating the 'Move to Improve' program would benefit the patients in the primary care clinic.

Implementation Framework

The DNP project was influenced by Stetler's Model of Research Utilization, which will help the practitioners to translate the evidence into practice (see Appendix C). It stimulates a critical thinking process that allows the practitioner to find the link between the research use and evidence-informed practice that will enhance the application of research to benefit the population. Stetler (2001) describes that the model flows through five distinct stages, the preparatory stage being the first stage involves identifying the purpose, goals, and need to solve a problem at an organization. It evaluates background evidence, barriers, and various factors, such as beliefs and resources, which influence the implementation of the change. It identifies the measurable outcomes for the evaluation phase. The project site had almost 60% of the population either overweight or obese, and the staff felt the need to develop a support system for patients. The various causes for the problem at the project site, measurable outcomes as well as

anticipated patient and provider barriers to the project were identified. The next phase is the validation phase which incorporates a methodical approach to appraising the evidence. It identifies the caveats and qualifiers for applying the evidence to practice. The evidence identified to support the project included level II randomized control trials with high validity and reliability (see Appendix A, Table A1). Comparative evaluation and decision-making comprise phase three of the Stetler model, and this phase involves synthesizing the evidence and deciding to 'use' or 'not use' the evidence based on its strength (see Appendix A, Table A1). The fourth is the application phase, which includes applying the synthesized recommendation to practice. Formulating an evidence-based solution for the identified problem would help patients at the project site develop an active lifestyle. The evaluation phase monitors the effect of the change with measurable outcomes such as increased exercise time, days, and increased motivation to exercise. It also recognizes any adverse consequences of the program and provides implications for future projects (Stetler, 2001). The DNP project intervention was formulated to meet the goal of the project site in supporting patients with obesity and overweight and eventually improve their satisfaction towards their health care providers and the practice.

Ethical Considerations

Three ethical principles that guided this project: Respect for person(s) and autonomy, beneficence, and justice. Respect for people is protecting the individual's vulnerability and personal integrity while applying and advancing scientific knowledge, medical practice, and associated technologies and autonomy is the capacity of self-governance (United Nations Educational, Scientific and Cultural Organization, 2005; Resnik, 2022). The project 'Move to Improve' adheres to these principles by assuring confidentiality for personal data and anonymity, informed consent for participation and communication of data (United Nations Educational,

Scientific and Cultural Organization, 2005). The information of the risks and benefits, what to expect and the assurance of protection of personal data by deidentification was provided as a written document to the participant at the first encounter.

Beneficence captures the importance of doing good to the participants (Melnyk and Fineout-Overholt, 2019). The project adhered to this principle by maximizing the direct and indirect benefits to the participants and avoiding doing any possible harm while advancing the scientific knowledge (United Nations Educational, Scientific and Cultural Organization, 2005). Participants were allowed, at any point of time, to withdraw their consent and every effort was made to conduct the project to ensure maximum benefit to the participants.

The principle of justice affirms that the resources were fairly distributed among the participants without prejudice (Melnyk & Fineout-Overholt, 2019). The project adhered to this principle by providing the resources available to all participants regardless of age sex, race, or ethnicity (United Nations Educational, Scientific and Cultural Organization, 2005). The intervention included motivation calls, sessions with a provider, education on the benefits of exercise and all the participants will receive every intervention with equality.

The project's methodology was reviewed by faculty mentors and submitted to the Institutional Review Board (IRB). The IRB reviewed the methodology of the project for human subject protection and safety and suggested minor changes and requested clarifications in the project proposal. The clarification was submitted, and project approval came through on September 13, 2023. The project implementation started and the steps in the proposal were followed as plan keeping in mind the safety of the participants.

Setting and Stakeholders

The project site is a primary care clinic which is one of the facilities of a larger organization and serves a vast population in the city of Mesa and Gilbert. According to 2021 statistics estimates by the United States Central Bureau, Mesa, and Gilbert, total population is 700K (United States Census Bureau, 2022). The practice serves patients aged 18 years of age through the lifespan. The mission of this facility is to improve the health and quality of life of the community of patients, clinicians, and employees, and it envisions to provide coordinated and integrated care across the healthcare delivery spectrum. Their patient population has many comorbidities like diabetes, hypertension, cardiovascular disease, and musculoskeletal conditions that can benefit from routine physical activity. The clinicians and the leadership are focused on helping their patient population meet their health outcomes; hence, implementation of 'Move to Improve' program is aimed to benefit the targeted patient population.

The stakeholders are patients, patient's family members, healthcare providers, other medical staff, administrative leadership, insurance companies, policy-making, and regulatory bodies. The patients will benefit the most from the program as they would have the physical and mental benefits of an active lifestyle. There is anticipated overall improvement in the quality of life and the metabolic health of the patients by participating in the project. The patient's family members indirectly benefit from the patient's improved quality of living, reduced fatigue, and improved health. Healthcare providers feel more involved in the patient's care and feel the satisfaction from helping patients to move in the right direction. The administration has the prospective advantage of better patient outcomes and patient satisfaction scores, which will help them sustain in a competitive market. Other healthcare professionals like the health coach, nurses, and medical assistants also feel the satisfaction of helping patients meet their health goals

and at the same time reap benefits, bonuses from the facility have more remarkable outcomes, and patient satisfaction feedback. Insurance companies will potentially benefit from reduced reimbursement and patient claims due to improved patient health. Policymakers and regulatory bodies striving to make policies and programs for public health could have positive outcomes from the programs and initiatives taken to curb obesity.

Project Description and Timeline

'Move to Improve' is an attempt to encourage patients in a primary care clinic struggling with obesity and overweight to lead an active lifestyle. The initiative will help patients feel supported by their healthcare professionals and provide them with control over their health. The project is guided by evidence that led to the development of interventions to motivate patients to increased exercise time and days per week, indicating a habit formation for an active lifestyle. The 'Move to Improve' program is a toolbox that includes a combination of evidence-based interventions shown to help develop an active lifestyle in the targeted patient population. The evaluation question answered at the end of the project is: How does the 'Move to Improve' program aid in supporting the patient population with obesity and overweight to adhere to an active lifestyle? The project adopts a design that examines the effect of the Move to Improve program on motivation to exercise and stay physically active, as indicated by increased exercise days and time. The 'Move to Improve' program is implemented over six weeks that included two motivational calls per week, educational session by a health care provider that included topics like what is obesity?, its complications and how physical activity is important followed by a question and answer session with the healthcare provider in the third week, a session with a personal trainer talking about body types and tips on incorporating simple exercises in one's daily routine followed by a question and answer session with the personal trainer in the fourth

week of the program, and an optional weight challenge with a reward at the end of the program (see Appendix D). Healthcare professionals were approached and agreed to be a resource for the participants in the project. A personal trainer was assigned to help the patient identify safe and individualized exercises performed at home without the need for complex equipment. The student was responsible for making motivational calls to the participants twice a week to motivate them to incorporate physical activity and providing participants with free online resources that they can utilize for their benefit. The weight challenge was voluntary to participants with a reward at the end of the program. The student developed a quick tips booklet for the participants and the project site with valuable and evidence-based information.

Following IRB approval, responsibilities were distributed to the project partners and resource personnel. The program began with four days of recruitment of participants, followed by six weeks of implementation of the 'Move to Improve' program. At the end of six weeks, two days were assigned for the post assessment of the participants. The participants were provided with appointments prior to attend the post assessment at the project site. Then, the project proceeded toward data compilation and analysis under the guidance of a PhD prepared mentor. The project results were communicated and disseminated to the site, the university faculty, the mentor, colleagues, and participants.

Participants and Recruitment

The participants are patients of the primary care clinic struggling with obesity and overweight. The World Health Organization (WHO) describes obesity and overweight as the abnormal accumulation of fat in the body compared to the individual's height as measured by Body Mass Index (BMI). A BMI of >25 is considered overweight, and >30 is obese (Centers for Disease Control and Prevention, 2022). The inclusion criteria include patients with a BMI of >25

and patients between the age of 18-69 years; as the International Physical Activity Questionnaire (IPAQ) scale (see Appendix E) has greater validity for the patients of that age group, English-speaking patients will be included. Exclusion criteria of the project are non-English speaking patients, patients not meeting the BMI criteria, and limitations to physical activity such as recent cardiovascular event, severe pain.

The student started recruitment a week and half after IRB approval, recruited 11 participants in the first four days. The front office staff were assigned to pass out the flier and the project information upfront. The medical assistant or nurse roomed the patients, and while they waited for the provider to see them, the patients had the opportunity to go through the information and the program details. The healthcare providers were made aware of the inclusion and exclusion criteria of the project. They referred patients that meet inclusion criteria to the student. The patients received a detailed explanation of the project and the expectations. If the patient was interested in the program, they were taken to a separate room where informed consent was completed. The patient was assigned an identification number, and the preliminary physical activity assessment with the International Physical Activity Questionnaire (IPAQ) scale was performed at the first encounter. A brochure with useful tips and resources, an activity kit that included water bottle, resistance bands and wrist and ankle weights for the participants to use during the program. Patients were explained about what to expect during the next six weeks and made aware of their right to withdraw from the project at any time and that their information will be protected and confidential. Patient's baseline weight and waist circumference were noted. They were made aware of the voluntary weight challenge and the award that would be given out to the participant who lost the maximum weight based on their own percentage of body composition.

Data Collection, Instruments or Tool and Outcomes Measurement

‘Move to Improve’ is program intended to encourage participants to adapt to an active lifestyle and the International Physical Activity Questionnaire (IPAQ) is the instrument that was used to identify the health-related physical activity for this program. It has 27 reported items for measuring physical activity and is valid and reliable among patients aged 18-69 years of age (International Physical Activity Questionnaire – Long Form, 2015) (see Appendix E). This tool was administered before and after the six-week program to assess the increase in physical activity of the participants indicating an intensified motivation. The tool was developed in the year 2000 in Geneva and was tested across 12 countries worldwide, including both developed and developing countries. The administration of the tool takes approximately 15-30 minutes (International Physical Activity Questionnaire – Long Form, 2015). The reliability of the questionnaire was tested using the test/retest reliability methods and was found to have an excellent interclass correlation coefficient for reliability (ICC=0.81) for the overall score of the questionnaire. It had excellent scores (ICC=0.84-1.000 for physical activity, and adequate (ICC=0.70) for sitting time (Craig et al., 2003; International Physical Activity Questionnaire – Long Form, 2015).

Demographic data was collected to include age, gender, ethnicity, barrier to physical activity, exercise days per week and approximate exercise time every day, insurance, and preferred format of information delivery for the educational session. It also included pre and post assessment of physical activity with the IPAQ scale. The preassessment with IPAQ was done on the day of recruitment after the procurement of informed consent and the post assessment was done after the six weeks of administration of the Move to Improve program. The tool measures the change in the participants’ physical activity levels indicating motivation from the

interventions. The other outcomes measured were weight and waist circumference, exercise days per week and approximate exercise time per day at the beginning and the end of the program, providing a quantifiable measure of increased physical activity. All the long and short-term outcome measures fit in perfectly with the Health Belief Model concepts as described above (see Appendix F). Reduction in the weight and waist circumference even if negligible in six weeks indicates participants accepting their condition and understanding their susceptibility to developing complications. Increased exercise time and days indicating participants efforts to overcome perceived barriers as they accept the benefits of increased physical activity and are motivated to be active with the education and motivational calls (cues to action) from their health providers' office. Participants developing an active lifestyle is proof of increasing self-efficacy among the participants.

11 participants were identified and recruited to the project with informed consents and the preassessment with IPAQ done on the recruitment day. The six-week program started after the recruitment was done, and the post test was done after six weeks. The data collected was compiled onto excel sheets and data tracking sheets and then was analyzed with guidance of the mentor to select the appropriate tests and program for analysis. The student was the only person with direct access to the data. The data was secured and saved in password protected/encrypted files with the password being changed often. The data was stored in password protected devices and was only transferred to individuals that were involved in the project such the project mentor with encryption on the transferred data. The de-identified data was compiled into excel sheets on the student's laptop which is also password and antivirus protected along with a self-lock out function activated. The data was transferred using pen drives or hard drives and stored in a secured cabinet. This data will only be saved a year after the student has graduated, the project

being completed, published, and presented by the student. All the electronic files, CDs, pen drives and hard drives with data will be permanently deleted after a year. All the paper format tools like the informed consent, case tracking sheets, filled out IPAQ scales will be shredded thereafter. The other experts with access to the data such as mentor were asked to delete the data too. Data analysis began once the data was collected, compiled, and scored. Descriptive data was used to describe the sample and outcome variables of physical activity, body weight and waist circumference. Paired t-test was used to analyze the outcome variables. The critical value was set at $p < 0.005$.

Budget

The project did not receive external funding. The total project expenses were \$14770 out of which the \$13,900 were waved in kind support by professionals. The major uncovered expenses were for the participation kit. The other expenses were for the required materials like the paper copies of the consent, IPAQ questionnaires, printing of brochures and fliers. The final voluntary weight loss challenge prize of \$75. The cash expense totaled up to \$1300. The expenses were borne by the student and budget details presented (see Appendix G).

Results

Intellectus Statistics™ (Intellectus Statistics, 2021) was used to store, manage, and analyze data. 11 participants were recruited, and 10 participants completed the post intervention questionnaire. The sample size for data analysis ($n=10$). It was observed that 80% of the participants were female and the rest of the 20% were male. 80% of the participants were Caucasians, 10% Blacks or African Americans and 10% were Hispanic. 100% of the participants had private insurance as they all were under the age of 65 years and did not qualify for Medicare.

Table 1*Demographic Data*

Variable	<i>n</i>	%
Gender		
Female	8	80.00
Male	2	20.00
Ethnicity		
Caucasian	8	80.00
Black/African American	1	10.00
Hispanic	1	10.00
Insurance		
Private	10	100.00

Note: n=10

The average age of the participants was 55.5 years (SD=9.00, min=36.00, Max =63.00).

The summary of the statistics representing age is presented below in Table 2

Table 2*Age of the Participants in the Project*

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	Min	Max
Age	55.50	9.00	10	36.00	63.00

Note: M= Mean, SD= Standard Deviation, n=10

Outcome measures***Reasons of Physical Inactivity***

Descriptive statistics were run to study the various reasons mentioned by participants for not engaging in physical activity before and after the interventions. It was observed that there were many reasons revealed by the participants as reasons for inactivity such as weather conditions, fear of falling, lack of time, lack of energy with lack of time and fear of falling being the most frequent reasons for inactivity pre-intervention. In the post – intervention, the various reasons for inactivity were reduced, and it can be interpreted as the participants were making

efforts to participate in physical activity. Lack of time was still most frequent reasons for inactivity post intervention. The summary of the reasons of physical inactivity is presented in the

Table 3

Table 3*Reasons of Physical Inactivity*

Variable	<i>n</i>	%
Pre - Reasons for not exercising		
other- bad knees	1	10.00
Weather Condition	1	10.00
Lack of time/ Lack of energy/work from home	1	10.00
Lack of time/Lack of energy	1	10.00
Lack of time	2	20.00
Fear of falling	2	20.00
Weather Condition/Lack of energy/Lack of time	1	10.00
Lack of time/ Fear of falling	1	10.00
Post- Reason for not exercising		
bad knees	1	10.00
fear of falling	2	20.00
lack of time	6	60.00
other	1	10.00

Note: n=10

Comparison of the Pre and Post Intervention Body Weight, Waist Circumference and Body Mass Index (BMI)

While comparing the data collected from the participants about the body weight, waist circumference and the calculated BMI before and after intervention, it was noted that there was a about 5-pound decrease in the means for the body weight of the participants, 1 inch reduction in the mean of waist circumference and the 2 kg/m² decrease in the mean calculated BMI post intervention. The data is presented below in Table 4

Table 4*Summary Statistics Table for Pre and Post Body Weight, Waist Circumference and BMI*

Variable	<i>M</i>	<i>SD</i>	<i>n</i>	Min	Max
Pre_Weight	227.54	40.23	10	170.40	301.40
Post_Weight	223.55	40.24	10	168.60	297.80
Pre_Waist_Circumference	44.60	4.74	10	38.00	51.00
Post_Waist_Circumference	43.65	4.92	10	37.50	53.00
Pre_BMI	39.34	11.29	10	26.70	58.30
Post_BMI	37.21	9.39	10	25.60	55.70

Note: M= Mean, SD= standard Deviation,
n=10

Comparison of the Walking, Moderate, Vigorous, and Total Physical Activity Scores Pre and Post Interventions.

Descriptive statistic was used to compare the change in the pre and post walking scores that is considered mild physical activity calculated in terms of Metabolic Equivalent (MET) minutes/ week. It was observed that post total walking MET average was 324.00 compared to 197.50 pre total walking average MET. Post moderate physical activity MET was 913.00 compared to 493.00 pre moderate physical activity MET. Post Vigorous physical activity MET was 120 in comparison of 84 pre vigorous physical activity MET. The post total physical activity MET was 1357 compared to 774 pre total physical activity MET. The summary of the means and the standard deviation (SD) are presented in the Table 5 below:

Table 5

Comparison of Walking, Moderate, Vigorous and Total Physical Activity MET

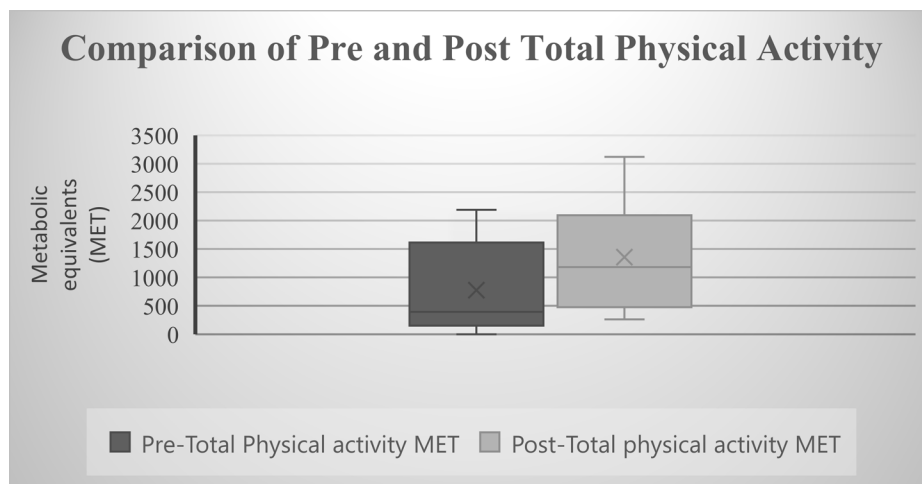
Variable	<i>M</i>	<i>SD</i>	<i>n</i>	<i>Mdn</i>
Pre_Total_walking_MET	197.50	183.47	10	155.00
Post_Total_walking_MET	324.00	311.45	10	277.50
Pre_Total_Moderate_MET	493.00	631.68	10	180.00
Post_Total_Moderate_MET	913.00	880.62	10	645.00
Pre_Total_Vigorous_MET	84.00	150.20	10	0.00
Post_Total_Vigorous_MET	120.00	193.91	10	0.00
Pre_Total_physical_activity_MET	774.50	802.50	10	395.00
Post_Total_physical_activity_MET	1,357.00	917.47	10	1,182.50

Note: MET- Metabolic Equivalent in minutes/week, Mdn= median

A two-tailed Wilcoxon signed rank test was conducted to determine the difference between Pre-Total Physical Activity MET and the Post Total Physical Activity MET. The test was found to be significant based on an alpha value of 0.05, $V = 5.00$, $z = -2.29$, $p = 0.022$. The median of Pre-Total Physical Activity MET ($Median = 395.00$) was noted to be significantly lower than the median of the Post Total Physical Activity MET ($Median = 1,182.50$). The ranked values are presented on the boxplot in the Figure 1 below:

Figure 1

Comparison of Pre and Post Total Physical Activity



Physical Activity in the Categorical Form

Participants when divided into categorical format of low, moderate, high categories of physical activity before and after intervention. It was noted that 50% of the participants were in the low physical activity category and 50% were in the moderate with none in the high physical activity category. Post-intervention, it was noted that the participant was categorized as 70% in the moderate, 20% in the low and 10 percent in the high categories indicating an increase in physical activity. The data is presented in the Table 6 below:

Table 6

Categorical of Physical Activity

Variable	<i>n</i>	%
Pre_categorical_score		
moderate	5	50.00
low	5	50.00
Post_categorical_score		
moderate	7	70.00
low	2	20.00
high	1	10.00

Note: n = 10

Further statistical analysis was done to observe the impact of the intervention on individual categories of physical activity such as activity at work, transportation, yard work, leisure activities and sitting time.

Activity Related to Work

A two tailed Wilcoxon signed rank test was conducted to examine the difference between the activity in work in MET minutes/week, pre and post intervention and it was found to be insignificant based on the alpha value of .05, $V = 0.00$, $z = -1.60$, $p = 0.109$. It indicated that the ‘Move to Improve’ did not significantly affect any changes in activity related to work.

Activity Related to Transportation

A two tailed Wilcoxon signed rank test was conducted to examine the difference between the activity related to transportation MET min/week, pre and post intervention and it was found to be insignificant based on the alpha value of .05, $V = 5.00$, $z = -1.16$, $p = .246$. It indicated that the 'Move to Improve' did not significantly affect any changes in activity related to transportation.

Activity Related to Yard Work

A two tailed Wilcoxon signed rank test was conducted to examine the difference between the activity related to yard work MET min/week, pre and post intervention and it was found to be insignificant based on the alpha value of .05, $V = 15.00$, $z = -0.89$, $p = .374$. It indicated that the 'Move to Improve' did not significantly affect any changes in activity related to yard work.

Activity Related to Leisure

A two tailed paired t-test test was conducted to examine the difference between the activity related to leisure in MET min/week, pre and post intervention. Normality assumptions were met. The results of the two-tailed paired t test were found to be insignificant based on the alpha value of .05, $t(9) = -2.06$, $p = .070$ indicating that the null hypothesis cannot be rejected. Thus, 'Move to Improve' did not significantly affect any change in activity related to leisure.

Change in the Sitting Time

A two tailed paired t-test test was conducted to examine the difference between the average sitting time on weekdays and weekends in MET min/week, pre and post intervention. Normality assumptions were met. The results of the two-tailed paired t test were found to be significant based on the alpha value of .05, $t(9) = 2.69$, $p = .025$ indicating that the null

hypothesis can be rejected. Thus, ‘Move to Improve’ had a statistically significant change in the average sitting time of the participants. Data is presented in Table 7

Table 7

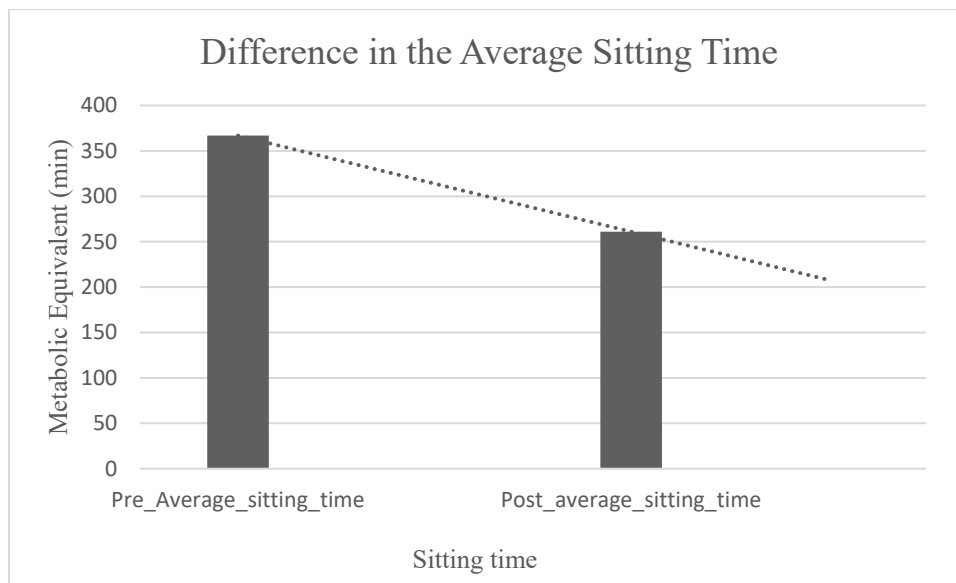
Two-Tailed Paired Samples t-Test for the Difference Between Pre-Average Sitting Time and Post-Average Sitting Time

Pre_Average_sitting_time		Post_average_sitting_time		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
366.85	176.53	261.00	110.07	2.69	.025	0.85

Note. N = 10. Degrees of Freedom for the *t*-statistic = 9. *d* represents Cohen's *d*.

Figure 2

Difference in the Average Sitting Time



Comparison of Body Weight Pre and Post Intervention

A two-tailed paired t test was conducted to examine the mean difference in the body weight of the participant before and after intervention. The normality assumptions were met. The results of the paired t test indicate that mean of pre-weight was significantly higher than the mean of the post weight based on the alpha value of .05, $t(9) = 4.48, p = .002$. This indicated that ‘Move to Improve’ helped the participants lose significant amount of weight after intervention.

Table 8

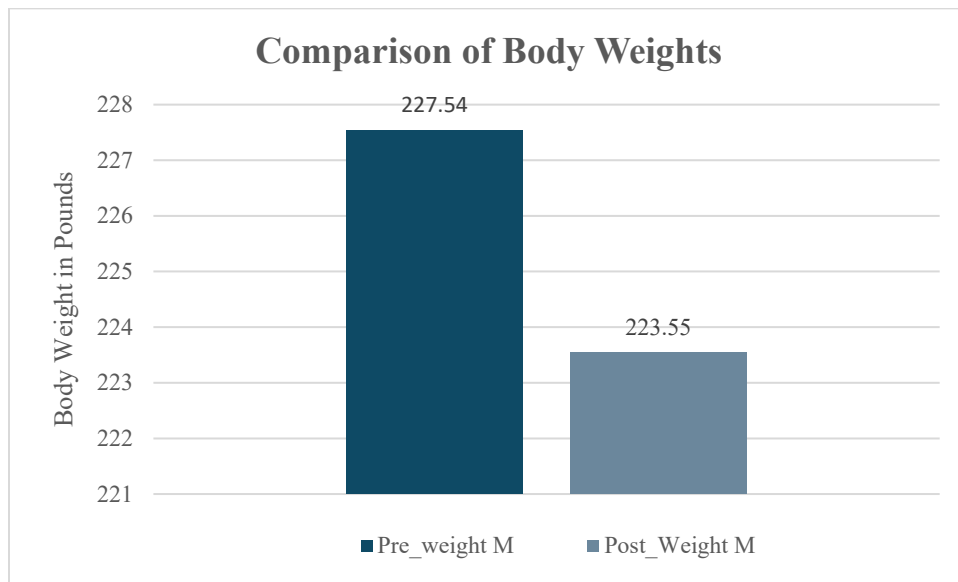
Two-Tailed Paired Samples t-Test for the Difference Between Pre_weight and Post_Weight

Pre_weight		Post_Weight		t	p	d
M	SD	M	SD			
227.54	40.23	223.55	40.24	4.48	.002	1.42

Note. N = 10. Degrees of Freedom for the t-statistic = 9. d represents Cohen's d.

Figure 3

The means of Pre-Weight and Post-Weight



Comparison of Waist Circumference Pre and Post Intervention

A two-tailed paired t test was conducted to examine the mean difference in the waist circumference of the participant before and after intervention. The normality assumptions were met. The results of the paired t test indicate that mean of pre-waist circumference was higher than the mean of the post waist circumference but was not significant based on an alpha value of .05, $t(9) = 1.89, p = .091$ and hence the null hypothesis cannot be rejected. This indicated that ‘Move to Improve’ did not have significant impact on the participants waist circumference. The data is presented in the Table 9 as shown below:

Table 9

Two-Tailed Paired Samples t-Test for the Difference Between Pre-Waist Circumference and Post-Waist Circumference

Pre_waist_circ_in		Post_Waist_Circumference		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
44.60	4.74	43.65	4.92	1.89	.091	0.60

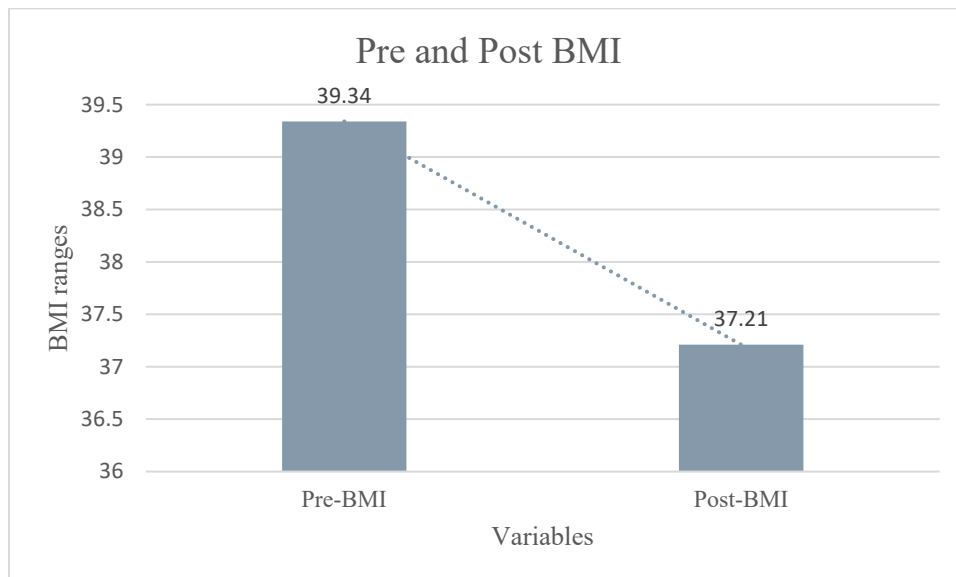
Note. N = 10. Degrees of Freedom for the *t*-statistic = 9. *d* represents Cohen's *d*.

Body Mass Index (BMI) Pre and Post Intervention

A two-tailed Wilcoxon signed rank test was conducted to examine whether there was a significant difference between Pre BMI and Post BMI. The results of the two-tailed Wilcoxon signed rank test were significant based on an alpha value of .05, $V = 54.00$, $z = -2.70$, $p = 0.007$. This indicated that the pre-BMI was significantly larger than the Post-BMI and that the null hypothesis can be rejected. ‘Move to Improve’ had statistically significant change in the BMI of the participants post intervention.

Figure 4

Comparison of Pre and Post BMI



Significance of Move to Improve: Statistical and Clinical

Move to Improve is a set of interventions that can be easily adapted to all primary care settings. It can apply to patients identified as high risk for obesity, leading to secondary disease conditions of diabetes and heart conditions. Move to Improve was statistically significant in increasing physical activity levels among participants, reducing sitting time, and reducing body weight and BMI. Within the short duration of the intervention, Move to Improve generated significant results, and it is hopeful that if incorporated into primary care settings, it can help patients achieve their activity goals and, in the long term, help in the control of chronic disease conditions.

Move to improve had a creditable impact on healthcare practices. It has the potential to help stakeholders such as patients, providers, practice, and insurance companies. Healthcare providers can actively participate in patients' health situations and provide real-time advice and directions by answering their questions. The patients feel like their problems are heard, are more willing to participate in the activities, and are motivated to engage in physical activity. With the reduced number of complications and better chronic disease maintenance scores, the insurance companies will reimburse the practice at a better rate. At the same time, insurance companies will see an overall reduction in their expenses in the long term. The healthcare system needs to emphasize and support more of these preventive strategies and aid in applying them into practice, which will eventually help reduce the economic burden on the country related to healthcare expenses.

Sustaining Move to Improve in Practice

A plan for sustaining the project at the project site was configured. The student attended the administrative meetings at the project site and the promising results of the 'Move to Improve'

program was presented to the team. The results of the project gathered interest in the intervention activities. Strong recommendations were made based on the results to convince the leadership to allot a budget towards the program and adopt it into the routine practice to help the patient population. The student shared digital copies of the tip's brochure with the resources and information and video recording of the sessions conducted during the program with the project site for use in the future. Trained the medical assistants and nurses to recruit patients with high BMI, A1c, and lipid profiles to the program and implement the 'Move to Improve' program. A medical assistant was assigned to call the patients with motivational calls throughout the week, and the transcripts of the individual calls used during the project were handed down by the student. A passionate provider would lead the educational sessions and the Q and A sessions for the participants. They may also use the recordings of the sessions delivered during the project or deliver a session based on the educational needs of the patients. The recordings of the personal trainer sessions and the videos handed to the site may be utilized for future. The program can be funded by charging the patient's insurance for obesity counseling and the funds can be used as an incentive for the staff that dedicate time to this program and for advancing the 'Move to Improve' program to the next level. With all the information provided, the practice should be able to run the 'Move to Improve' program smoothly.

Discussion of the Findings

Obesity is a public health concern and is a growing trend. It incurs an immense economic burden on the country's economy. A combination of factors causes obesity and requires a comprehensive, multifaceted approach of strategies, including healthy eating, physical activity, and medical intervention. With the advent of the obesity drugs, many individuals are opting for a medical approach to this problem. The inaccessibility to these drugs has made physical activity

more essential in daily living. There are many unknowns about the effects of the newer obesity drugs on human beings in the long term. Until more access to information, physical activity and healthy diet are the next safest fundamental strategies for maintaining a healthy weight.

Incorporating physical activity with or without medical treatment of obesity is essential for bone and muscle strength and overall mental health.

‘Move to Improve’ is an intervention that helps healthcare providers actively participate in their patients' health. It provided the patients with evidence-based information to practice physical activity safely in their daily routine. ‘Move to Improve’ in a short period of time, encouraged the patients to increase their physical activities, ensured them that certain activities can be done while at home and that physical activity does not require expensive equipment, memberships, and much time. Incorporating activity means adding physical activity while performing other duties and activities such as cooking, walking a dog, and watching television. Many participants needed to be made aware of the fact that yard work, walking a dog, and walking around the kitchen island were considered part of daily physical activity. Move to Improve trained the participants to be aware of their physical activity and to closely monitor it while encouraging them to improve their activity levels throughout the day. Being aware of their physical activity helped the participants to eventually make efforts to incorporate more activities that were fun. ‘Move to Improve’ helped participants lose weight and made significant change in the Body Mass Index post-intervention. The participants reported a significant change in sitting time. Decreased sitting time indicated that the participants were moving, which was the whole purpose of the project.

Strengths

‘Move to Improve’ incorporated evidence-based interventions that were proven to help patients suffering from obesity. It helped engage participants' interest in the project as it connected with what the participants' need of improving their physical activity levels without being judged or stigmatized for their weight. Due to the participant engagement, they could lose weight. The interventions are cost-effective and can be easily adaptable to any setting.

Limitations

The participants self-reported the physical activity levels, and there was a possibility that the physical activity levels could be exaggerated. The project measured pre- and post-body weight and waist circumference to provide quantifiable data. The change in body weight post-intervention provided adequate evidence that participants made efforts to practice physical activity.

The difficulty in engaging the providers due to their busy schedules served as a limitation of the project. Even though they wanted to participate in the project, they needed help finding the time to participate and provide substantial support. The sample size for the project was small that affected the ability to interpret the results. The project had a short duration for the application of the intervention and hence was unable to see an effective result of the project.

Future Recommendations

Move to Improve can be utilized as an efficient, economical, preventive method of encouraging patients at risk for obesity. The project can be incorporated into various practices in the community, covering a vast population. Primary care practice can build a team that targets preventable diseases and help integrate the ‘Move to Improve’ as an intervention targeted toward overall health, emphasizing the well-established benefits of physical activity. The project can be

replicated for patients of other populations, such as patients who have diabetes, cardiovascular risks, and musculoskeletal conditions, to establish the effect of 'Move to Improve' on their health. The project can be replicated to identify its future effects on the patient's mental health.

Conclusion

In a community that has comfortably adapted to living a sedentary life and underestimated its ability to move and be physically active, 'Move to Improve' is an initiative to help patients believe that they can take control of their health and not underestimate their capability to be active. It pushes the patients to believe they are not alone and have the resources and support from their healthcare provider. Move to Improve allows the participants to explore and have fun while working for a healthy, active lifestyle, and that healthy is not always tasteless and bland. Healthcare providers can feel at peace that their patients are supported while they are busy attending to the medical needs of the growing population. 'Move to Improve' is a six-week program designed to support the patient in forming a habit in these six weeks of staying active. At the same time, patients will have the resources, knowledge, and support they need to continue this new behavior.

The 'Move to Improve' program has the potential to help patients not just struggling with obesity but also patients with diabetes, hypertension, cardiovascular and musculoskeletal conditions, and mental health conditions have been shown to have positively impacted by physical activity (World Health Organization, 2022). Physical activity has proven beneficial for patients suffering from all these conditions, and further study needs to be conducted for these populations. Through this project, patients are expected to have improved satisfaction with the care and support provided by the practice and better patient health outcomes that will help the practice achieve better insurance reimbursements and survive in a competitive market.

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Appendix A

Evaluation and Synthesis Tables

Table A1: Evaluation Table for Quantitative Studies

Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
<p>Clemes et al., 2022. The effectiveness of the structured health intervention for truckers (SHIFT): A cluster randomized controlled trial.</p> <p>Country: Midlands, United Kingdom</p> <p>Funding: National Institute for Health Research Public</p>	<p>Social Cognitive Theory for Behavior Change</p>	<p>Design: Cluster RCT</p> <p>Purpose: The effectiveness of SHIFT programme on device assessed physical activity for HGV drivers at 6 month and then at 16-18 month on range of activity and secondary</p>	<p>N= 382 Heavy goods vehicle drivers SHIFT group-183 participants Control group 199 participants</p> <p>Demographics: 99% of the participants were Male. The Median age was 48 years.</p> <p>Setting: Transport depots with at least 20 HGV drivers</p>	<p>IV1: SHIFT programme DV1: Daily Step count DV2: Sitting time.</p> <p>Definitions: SHIFT programme is Multicomponent lifestyle behavior intervention, 6 hours structured education session about physical activity, diet,</p>	<p>Tools: Fitbit Charge 2 activity tracker Step count challenges Cab workout- with resistance bands and balls grip strength dynamometer ActivPAL3 micro to measure sitting time.</p> <p>Validity/ Reliability: The study only used tools that provided. Quantitative numbers and did not use any scales that required validation.</p>	<p>Statistical Tests Used: Linear Regression Model</p>	<p>DV1: SHIFT group has 1008 more steps/day than the control group at 6 months.</p> <p>DV2: Sitting time was less for SHIFT group compared to the control at 6 months. -No difference seen between</p>	<p>Level of Evidence: Level II: RCT Strengths: The trial incorporated short term and long-term follow-ups. The trial was implemented in an underserved and hard to reach population. Outcome measures were device monitor reducing bias. Weakness: high attrition rates</p>

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<p>Health research programme</p> <p>Bias: No Bias noted</p>		<p>health outcomes</p>	<p>and located within 2-hour drive from Loughborough university</p> <p>Exclusion: Short-haul drivers were excluded Drivers with heart disease, hemophilia, blood borne viruses and mobility limitations were excluded.</p> <p>Attrition: 60 to 74% completion rate at 6 month follow up 18 month- 52% of the participants completed the follow up.</p>	<p>sitting and risks of diabetes and cardiovascular disease</p>			<p>the groups at 18 months</p>	<p>-High staff turnover rates at the transport sites -Follow ups were affected by the pandemic.</p> <p>Feasibility: The study can be replicated not only for the HGD driver but also for individuals in a sedentary workspace</p> <p>Application: It can be applied in a primary care setting for patients to reduce the sitting time and increase the steps count/ day.</p>
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<p>Hoerster et al., 2022, Effect of a remotely delivered self-directed Behavioral intervention on body weight and physical health status among adults with obesity: The D-ELITE Randomized Control trial.</p> <p>Country: United States</p> <p>Funding: Department of Veterans Affairs Health Services Research and Development</p> <p>Bias: No Bias noted</p>	<p>Transtheoretical Model of Behavior (Inferred)</p>	<p>Design: RCT</p> <p>Purpose: To test whether a self-directed, remotely administered behavioral lifestyle intervention improved weight and self-reported health status among patients</p>	<p>N= total 511 intervention group- 254 Usual care 257</p> <p>Demographics: mean Age of participants was about 57.4 years Males 55% and female 45%. Number of participants that were white (70.9%)</p> <p>Setting: 30 Western US VA primary care clinics</p> <p>Exclusion: Patients with <30 and >45 of BMIs was excluded. Patients with medical conditions that would make weight loss unsafe were excluded.</p> <p>Attrition: Attrition rate was 20%.</p>	<p>IV1: Remotely administered behavioral lifestyle intervention. DV1: Weight DV2: General physical health status</p> <p>Definitions: Behavioral Lifestyle Intervention or D-ELITE is an evaluation of lifestyle intervention to treat elevated cardiovascular risk through a weight loss programme that reduces the risk of chronic health condition. It mostly self-directed and with very few</p>	<p>Tools: Weighing scale My fitnessPal.com- online tracking program for self-monitoring exercise, nutrition consumption and weight</p> <p>Scales used included were the 12-item short form Health survey (SF-12), Physical composite score (PCS)</p> <p>Validity/Reliability: The 12-item short form Health survey had a medica validity of 0.67.</p>	<p>Statistical Tests Used: Mixed effects liner regression model</p>	<p>DV1: At 12 months, the weight change noted was 2.5kg less for the intervention group as against the control group was 0.4kg. The P value for weight is 0.001 and is statistically significant.</p> <p>DV2: At 12 months SF-12 PCS score declined for the intervention group by 0.4 and control group by 0.9. The P value for general physical health status</p>	<p>Level of Evidence: Level II: RCT</p> <p>Strengths: The intended to bring a behavioral change in the patient without much external coercion.</p> <p>Weakness: -High data missing rates. -Self-monitoring was allowed only for the intervention group and thus denies self-monitoring opportunity for the control group -Unable to generalize to all VA group due to the low chronic condition prevalence in the participants</p>
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				contact hours with a coach			was 0.39 and thus statistically insignificant.	<p>Feasibility: The study can be easily replicated as it does not use complicated technology.</p> <p>Application: the study was performed in a primary care clinic for VA patient and can be applied to the regular Primary care offices and on patients with chronic conditions.</p>
Lambert et al., (2022), A process evaluation, with mediation analysis, of a web-based intervention to augment primary care exercise referral schemes: The e-coachER	Self Determination Theory e-coachER Logic model	<p>Design: RCT</p> <p>Purpose: To examine the e-coachER intervention led to any favorable changes compared to</p>	<p>N= sample size varied due to non-completion of full set of measures The intervention group ranged 93-100 participants. Control group ranges 113- 122 Demographics: inactive population</p>	<p>IV1: e-coachER intervention DV1: self-reported MVPA DV2: minutes on accelerometer Definitions: e-coachER- it is a website to promote the</p>	<p>Tools: 7-day physical activity recall questionnaire at 4 months and 12 months. -Components of self-determination theory measured with -11 point-Likert scales for importance and confidence -Perceived competence scale for competence-psychological need</p>	<p>Statistical Tests Used: Mixed effects linear model Mediation analysis using product of</p>	<p>DV1: participant in the intervention group reported more favorable PA beliefs at 4 months than the control group. The</p>	<p>Level of Evidence: Level II- well-designed RCT. Strengths: One of the rare studies to look at mediations effects of accelerometer measure physical</p>

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<p>randomized controlled trial.</p> <p>Country: Plymouth, Birmingham, United Kingdom</p> <p>Funding: National Institute for health research (NIHR), Health technology programme</p> <p>Bias: No Bias was found</p>		<p>exercise referral programs alone.</p>	<p>with sedentary occupation, 0-hour physical activity per week or in a standing occupation with at least 1 chronic condition like obesity, hypertension, DM-type2, osteoarthritis and depression</p> <p>Setting: population referred by a primary care practitioner to a local ERS in Greater Glasgow, Birmingham or Plymouth and adjacent rural areas</p> <p>Exclusion: exclusions were not described</p> <p>Attrition: sample size varies for various set of measures due to non-completion of</p>	<p>physical activity via specific behavior change techniques</p>	<p>satisfaction in exercise scale-autonomy -action and coping planning scale for action planning</p> <p>Validity/Reliability: The multi scale measure for the constructs were not validated but exploratory factor analysis indicated that Cronbach’s alpha coefficient of the multi-items scale was 0.77.</p>	<p>co-efficient method.</p>	<p>exercise minutes increased by 22.9 weekly min.</p> <p>DV2: No direct effect of the intervention (e-coachER) on the participants at 4 months but still lead to increase in MVPA for some participants. The increase was seen in the competence at 4 months from 17.82 to 37.53 for CI of 95%</p>	<p>activity and followed participants for 1 year.</p> <p>Use of bootstrapping for sample distribution. Measured effective engagement among participants. BCTs were mapped on the theoretical underpinnings of SDT.</p> <p>Weakness: proper validity was not conducted for the scale items replaced or changed. Certain interpretation of the results needs to be done with</p>
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			the full set of measures by the participants					caution and can confuse the readers. Feasibility: this study can be easily replicated with more validated scales. Application: This study provides new important insights on implementation of web-based interventions in the existing healthcare.
McRobbie et al., (2019), Randomized controlled trial and economic evaluation of a task-based weight management group programme. Country: United Kingdom	Planned behavior theory (inferred) Not described in the theory	Design: two arm, parallel group randomized control trial Purpose: to develop a multi model task-based group	N= 330 WAP= 221 PNI= 109 Demographics: Mean age 45 years. Female 70% White 40% Employed 49% Included- adults >18 years of age with BMI >30 kg/m ² or >28 kg/m ²	IV1: WAP IV2: PNI DV1: weight reduction at 2 and 6 months DV2: waist circumference and blood pressure DV3: : food craving inventory	Tools: International Physical Activity Questionnaire, Food Craving Inventory Health Services questionnaire, three Factor Eating questionnaire and Picture based Food knowledge Assessment. Validity/ Reliability: The scales used were standardized tools and believed	Statistical Tests Used: Mixed effect Linear regression model Kenward-Roger degree-of-freedom	DV1: participants in the WAP group lost more weight (4.2 kg) than the PNI group (2.3 kg) at 6 months. At 12 months, WAP lost	Level of Evidence: Level II: randomized Control trial Strengths: It found cost-effective methods for the ethnic minorities that improved overall health-

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<p>Funding: National Institute of Health Research Health Technology Assessment.</p> <p>Bias: no biases were noted</p>		<p>intervention that cost effective for disadvantaged population</p>	<p>with co-morbidities. Setting: general practices in London inner city boroughs of Tower Hamlets and Hackney (economically deprived boroughs in London) Exclusion: Not speaking English, BMI > 45, lost >5% body weight in the last 6 months, pregnancy, currently on psychiatric medication Attrition: WAP (weight action programme) group- about 72 dropped out at the 12 month follow up And PNI (practice nurse intervention) group- 26 participants</p>	<p>Definitions: WAP- task based multi modal group intervention including advice along with concrete, verifiable task using task cards filled out every day for the participants. PNI: is the standard care that provides nurse-provided advice on diet, activity, and self-monitoring.</p>	<p>to have high validity and reliability. -The study does not describe it in detail. -IPAQ- reliability score ranges between 0.71-0.89 and had acceptable validity and reliability. -Food craving inventory: The reliability score of the total score was 0.93. It had a concurrent validity of 0.68. Three factor eating questionnaire: 0.83 to 0.93 reliability.</p>	<p>correction was used.</p>	<p>41% and PNI lost 21% DV2: waist circumference changes were more in WAP (-4.1 cm) but not significant. DV3: increased knowledge about the calorie content of food in the WAP group.</p>	<p>related quality of life. Moderated retention rates Include a good representation of the disadvantage groups. Weakness: Participants predominantly women and thus cannot be generalized across genders. Non- blinded trials of behavioral intervention that can lead to drop out of participants. Feasibility: the study can be easily replicated in a different setting Application: This study can be</p>
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			dropped out at 12 months follow up. Retention rate 61% at 12 months.					applied in the primary care settings to promote healthy behaviors
Lee et al., 2021. Effectiveness of the fun for wellness online behavioral intervention to promote wellbeing actions in adults with obesity or overweight: A randomized control trial. Country: United States Funding: No funding information found but the authors were affiliated to Michigan State	Self-Efficacy Theory	Design: RCT Purpose: To evaluate the effectiveness of the Fun for Wellness (FFW) online behavioral intervention to increase wellbeing actions in adults with obesity in the United States.	N: 667 Control- 336 Experimental: 331 Demographics: Female (67.2%) White, non-Hispanic (74.1%) Educated with 4-year college degree (60.1%) Married (65.2%) Full time job (62.6%) 40 years old (55.6%) Annual income at least \$70,000 (51.6%) Setting: National Health care panel recruitment company in United	IV1: FFW Online Behavioral intervention DV1: Well-being actions DV2: Well-being self-efficacy Definitions: FFW- is a self-efficacy based online interventions designed to promote growth in wellbeing and physical activity by providing learning opportunities to participants.	Tools: I COPPE action scale that measure the well-being actions WBASE scale- measured well-being self-efficacy. Validity/Reliability of the scales: - I COPPE scale has 0.75 to 0.87 reliability and validity is 0.877 -WBASE scale has 0.75-0.84 reliability and validity of 0.86	Statistical Tests Used: Single Path analysis model.	Hypothesis 1 (WBASE on FFW group/UC) - The mean difference was statistically significant for two domains (community and interpersonal) in FFW group compared to the usual group (p<0.05) and not significant in the rest of the four domains (p>0.05)	Level of Evidence: Level II: RCT Strengths: The study was guided by an established theory. -the tools used were validated and dependable. -it is a large-scale randomized study with a large sample size conducted in an uncontrolled setting and thus it is close to the real-world setting. Weakness: -The FFW framework is

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<p>University and University of Miami. Bias: No Bias noted</p>			<p>states. Recruitment was done in an uncontrolled setting. Exclusion: Participants outside of united states Patient <18 years or >65 years BMI<25 kg/m² were excluded. Attrition: There were good retention rates in the study. about 80% of participants completed the surveys at the designated times</p>				<p>- Hypothesis 2: WBASE at T2 (30 days) WBA at 60 days- statistically significant for all the domains (p<0.001, CI-95%) Hypothesis 3: WBA at 60 days in FFW group and Usual care group - statistically significant for a P value of <0.05 on two domains and non-significant in the rest four domains. Hypothesis 4: FFW intervention</p>	<p>unable to explain why the intervention increase or did not increase well-being efficacy or actions -most of data collected was through self-report. Feasibility: This study can be replicated in a smaller setting and can be conducted in controlled environment in primary care settings. Application: FFW intervention is applicable in promoting wellbeing actions among obese and overweight populations in</p>
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							<p>effected WBA at 60 days through WBASE at 30 days- was statistically significant for only two domains for a p value <0.05. The effect size of the study was $d = 0.2$ (small). The appropriate effect size was estimated to 2000.</p>	<p>the primary care setting.</p>
<p>Katzmarzyk et al., 2020. Weight loss in underserved patients: A cluster randomized trial</p> <p>Country: United States</p> <p>Funding:</p>	<p>Social Cognitive Theory (inferred)</p>	<p>Design: Cluster RCT Purpose: To test the effectiveness of a high intensity, lifestyle-based program for obesity</p>	<p>N: total 803 patients 452 in the intensive lifestyle group and 351 in the usual care group.</p> <p>Demographics: Mean age 40.5,</p>	<p>IV1: intensive lifestyle-based program. DV1: reduction in body weight at least 3-5% Definitions: Intensive lifestyle program is an</p>	<p>Tools: electronic scales (BodyTrace) Anthropometric tape to measure waist circumference. Blood pressure and pulse, fasting finger blood stick with Cholestech LDX device to check lipid profile. Scales : PROMIS-29 is a 29-item questionnaire the measure</p>	<p>Statistical Tests Used: Generalized linear mixed Models and Chi-square tests.</p>	<p>DV1: patient in the intervention group has a significant weight change of -4.99% with CI 95%. Greatest</p>	<p>Level of Evidence: Level II: Cluster RCT</p> <p>Strengths: included a diverse population from urban and rural regions.</p>

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<p>Funded by Patient Centered Outcomes Research Institute, Health, and Nutrition technology, Nutrisystem. Bias: No Bias noted. The supporting companies only supplied products for the studies.</p>		<p>treatment in a population with low income.</p>	<p>84.4% Female, 67.2% patients were Black, 65.5% had annual income <\$40,000. Setting: 18 primary care clinics in Louisiana. Randomly assigned to intensive lifestyle group or usual care group. Exclusion: -any current participation in a weight loss program , weight loss medications, history of bariatric surgery or any recent weight loss. Attrition: 83.4% of participants completed the trial at 24 months</p>	<p>intervention delivered by health coaches and includes weekly sessions for the first 6 months and then monthly sessions for the next 18 months.</p>	<p>health status for physical, mental, and social well-being. - Dietary intake inventory -IWQOL-lite questionnaire. - Modifiable activity questionnaire (MAQ) Validity/Reliability of the scales: - PROMIS-29 showed structural validity and has reliability of >0.9 Dietary intake inventory reliability of >0.7 and construct validity- IWQOL-lite has 0.93 total reliability scores. -MAQ had reliability of 0.97 and relatively moderate validity</p>		<p>weight change was at 6 months but still statistically significant at 24 months. Change in waist circumference was -5.85cm more than the usual care group at 6 months. Intervention group 50.7% had at least 5 % weight loss and 23.2% had 10% weight loss.</p>	<p>-can be broadly generalized on the underserved low-income population of US that face major barriers to obesity treatment -incorporated trained health coaches Weakness: Participants included 84%women and thus limited the classification based on sex or race. Missing weight measurements and potential course of bias. Feasibility: The study can be easily replicated in other primary care setting to help the obese</p>
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								and overweight population Application: The intervention to promote wellbeing among obese patients may be beneficial and acceptable to the participants.
Katzmarzyk et al., 2021. Weight loss in primary care: A pooled analysis of two pragmatic cluster-randomized trials Country: United States Funding: Patient-Centered Outcomes research Institute, National Institute of General Medical Sciences of the National	Social Cognitive Theory (inferred)	Design: Two pragmatic Cluster RCT Purpose: to report the results of five weight-loss interventions (2 from PROPEL and 3 from REPOWER) in primary care settings in underserved patients and compare the level of pragmatism	N: 803 from the PROPEL study and 1407 from the REPOWER trial Demographics: Mean weight 102.6 Kg, mean age 52.4 Mean BMI 36.9 71.6% white and 67.4% Black individuals, 79.6% females Setting: Patients from 18 clinics in Louisiana. 36 clinics from Midwestern US from the REPOWER study.	IV1: PROPEL intervention. IV2: REPOWER intervention. DV1: Change in body weight at 24 months with PROPEL and REPOWER intervention. Definitions: PROPEL intervention- weekly counseling sessions (16 in-person and 6 telephone) in the first 6	Tools: Portable stadiometer for height, digital scale for weight, non-elastic anthropometric tape for waist circumference, Blood pressure with Omron Device, fasting glucose, and lips with a validated Alere Cholestech LDX device Scales: REALM-SF Household food security PROMIS-29, IWQOL-Lite IPAQ-SF: Validity/Reliability of the scales: - REALM-SF- has a reliability of 0.99 and excellent concurrent validity. Household food security has a reliability of 0.87.	Statistical Tests Used: Linear mixed effects multi-level model	DV1: The weight loss at 24 months ranged from *-0.50 kg in the PROPEL-usual care. *-3.05 kg in REPOWER clinic-individual intervention group, *-4.30 kg in the REPOWER Phone intervention group.	Level of Evidence: Level II: cluster RCT Strengths: Large sample size Pragmatic approach to the results. Weakness: There were differences in both study criteria and differences in the participant demographics - Heterogeneity of the counselors

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<p>Institutes of Health</p> <p>Bias: No Bias noted</p>			<p>Exclusion: participants of the PROPEL trial were all eligible to be included and 25 participants were excluded from the REPOWER trail as 3 died, 9 became pregnant and 4 underwent bariatric surgery and 9 developed advanced cancer.</p> <ul style="list-style-type: none"> -Patients enrolled currently in a weight loss program or weight loss medication. -Previous bariatric surgery -Psychiatric condition like depression or other conditions like congestive heart failure, heart attacks or stroke, arthritis -Substance abuse 	<p>months, followed by monthly sessions (alternating in-person visits and telephone calls) for the remaining 18 months</p> <p>REPOWER-clinic-individual group received 15- minute face-to-face individual counseling visits from practice-employed clinicians that occurred weekly for 1 month, every other week for months 2 to 6, and monthly thereafter.</p>	<p>PROMIS-29- showed structural validity and has reliability of >0.9,</p> <p>IWQOL-Lite has 0.93 total reliability scores.</p> <p>IPAQ-SF reliability score ranges between 0.71-0.89 and had acceptable validity and reliability.</p>		<p>*-4.79 kg in the REPOWER clinic group.</p> <p>*-4.80 kg in the PROPEL clinic and phone intervention group</p> <p>At 24 months, PROPEL clinic/phone group maintained 66.8% of the initial weight loss as against 49.0% in REPOWER-clinic-individual, 55.1% in REPOWER-clinic- group, and 53.1% in the</p>	<p>and the health coaches</p> <p>Feasibility: the study can be replicated in a different population that may benefit from weight loss. More strategies can be developed for weight loss maintenance based on the results.</p> <p>Application: The results are useful and applicable to the general population</p>
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			-Pregnant or delivered in the previous year. Attrition: the dropout rates not mentioned in the study. Follow up rates ranged between 81.1% to 87.7%	REPOWER clinic group got 60 min visits weekly for first 3 months and then every other week for 4-6 months and monthly thereafter.			REPOWER-phone-group.	
Oddone et al., 2018. A coaching by telephone intervention on engaging patients to address modifiable cardiovascular risk factors: A randomized controlled trial. Country: United States	Health Belief Model (inferred)	Design: two arm RCT Purpose: to assess the effectiveness of a Health risk assessment coupled with a brief health coaching intervention to activate veterans to enroll and participate in prevention	N= 417 Intervention group n= 208 Usual care group n=209 Demographics: Average age 56years, African American 40%, Male 85 %, 25% of participants had financial vulnerability	IV1: Health coaching intervention DV1: enrollment in a structured prevention program DV2: patient willingness to participate in program to reduce cardiovascular risk factors, changes in the	Tools: PAM and FRS Validity/ Reliability of the scales: - PAM has high construct validity and is high reliability score of 0.81 -FRS validation is missing but has been widely used in many studies to predict cardiovascular risk.	Statistical Tests Used: logistic regression and Linear Model with unstructured covariance.	DV1: There was higher enrollment in the prevention program 51% in the intervention against 29% in the usual care group (p<0.0001, CI 95%) DV2: higher participation in the prevention	Level of Evidence: Level II: RCT Strengths: the study encourages health risk screening and promotes it in the primary care setting. The study was intended to improve enrollment in the prevention program and not track specific risk

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<p>Funding: Department of Veterans Affairs, Health Services Research and Development Service</p> <p>Bias: No Bias noted</p>		<p>programs chosen based on their needs and preferences.</p>	<p>Setting: Three Veteran’s Health administration primary care clinics Ann Arbor, Michigan, Durham, North Carolina, and Greenville, North Carolina.</p> <p>Exclusion: Dementia or other psychiatric conditions, substance abuse disorder, severely impaired hearing, or speech, unable to speak English, serious/terminal illness, no access to a telephone.</p> <p>Attrition: very few dropouts were noted from the intervention about 7% and usual care about 4%</p>	<p>PAM and FRS scores.</p> <p>Definitions: Health coaching intervention- includes two phone calls to the participants by the health coaches at 1 week from baseline and 1 month later.</p> <p>PAM score: is a 13-item measure that assesses activation in terms of an individuals’ knowledge, skills, beliefs, and confidence for managing their health.</p> <p>FRS- it is a cardiovascular risk assessment tool that includes blood</p>			<p>program noted 40% to 23% PAM scores showed greater improvement at 6 months from baseline for the in the intervention group than the usual care (p=0.03)</p> <p>FRS scores showed no significant change at 6 months from baseline in both groups (p=0.33, 05%CI)</p>	<p>factor behavior like exercising, smoking.</p> <p>Weakness: the primary outcome was determined by self-report. Majority of male participants. Research assistants were not blinded on the 6month month follow up.</p> <p>Feasibility: The study can be easily replicated, and more can be done to promote the</p> <p>Application: The study is appropriate in motivating patients with risk factors to take steps towards healthy lifestyle.</p>
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				pressure and lipid measurement.				
Slater et al., 2022. Testing the effectiveness of a novel, evidence-based weight management and lifestyle modification programme in primary care: The healthy weight initiative Country: Australia Funding: No funding was received. Bias: No Bias noted	Theory of planned behavior or health belief model (inferred)	Design: Clustered RCT Purpose: To test the effectiveness of a novel model of care, an online, structured, and scripted evidence-based weight management and lifestyle modification programme running over 12 weeks.	N: Total 695 Intervention group-390 Control group -305 Demographics: Mean age 45.6 years Female 79%, Male 21%, Setting: General practices across Hunter New England and Central Coast Primary Health Network, Australia Exclusion: patient <18 and >65 years of age, BMI <25 , history of eating disorders, pregnant or breast-feeding patients	IV1: Healthy Weight Initiative programme DV1: weight loss at 12 weeks DV2: waist circumference Definitions: Healthy Weight Initiative programme- it is an intervention that provides high intensity support with 10 weekly additional measurements, evidence-based education, support sessions on healthy eating, physical activity, and lifestyle modification.	Tools: Weight measured with the same equipment every time the patients have visits, and the waist circumference was measured with a non-extensible steel tape Validity/Reliability of the scales: - not required. The devices were calibrated and kept the same during the study	Statistical Tests Used: Analysis of Covariance (ANCOVA) liner mixed effects regression.	DV1: Intervention group lost on average 3.2 kg weight as against 1.7 kg in the usual care group. One third participants 29% lost clinically significant >5% of body weight compared to 17 % of the usual care. DV2: The intervention group lost an average -3.9 cm compared to 2.2 cm in the usual care group	Level of Evidence: Level II: RCT Strengths: the intervention was an evidence-based design that supports current recommendations Weakness: High dropout rates. Missing data Effect of practitioner motivation was not assessed on the outcomes. Cluster analysis not done to account for variance in terms of staffing and practitioner expertise. Feasibility: The study can be replicated easily

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			Attrition: At 12 months, only 44% of the participants were follow up and 56% dropped out of the study					in any primary care setting. To reduce the dropout rate, the no. of visits needed can be reduced to avoid participants having to come every week. Application: the study results can be applied to the obese and overweight population.
Ladapo et al. 2023. Effectiveness of goal-directed and outcome-based financial incentives for weight loss in primary care patients with obesity living in socioeconomically disadvantaged	Behavioral Economic theory	Design: RCT Purpose: To compare the effectiveness of goal-directed vs outcome-based financial incentives on weight loss at 6 months	N: total 668 221 in the Usual care group 222 goal directed group. 225 outcome-based group. Demographics: Mean age: 47.69, women 81%, black 99%, Hispanic 72.6%	IV1: Goal directed incentive. IV2: Outcome-based incentive DV1: Weight reduction>5% at 6 months, at 12 months Definitions: Goal directed incentive group: Earned	Tools: Weighing, Blood pressure device, tape, Pedometer Validity/Reliability of the scales: - IPAQ-SF- reliability score ranges between 0.71-0.89 and had acceptable validity and reliability -PROMIS-29 showed structural validity and has reliability of >0.9,	Statistical Tests Used: Liner Mixed effects model.	DV1: At 6 months, percentage of patient that lost at least 5% of body weight was 22.1% in the usual group, 39%in the goal directed group and 49.1%in the	Level of Evidence: Level II: RCT Strengths: Financial incentives can be motivation Weakness: The programs were expensive. Limited generalizability in the higher

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<p>neighborhoods: A randomized clinical trial</p> <p>Country: United States</p> <p>Funding:</p> <p>Bias: No Bias noted</p>		<p>among patients with obesity living in low-income neighborhoods</p>	<p>Spanish speaking 34.6%</p> <p>Setting: 3 Hospital based clinics in New York and Los Angeles</p> <p>Exclusion: Patients who have lost >4.5 kg weight recently or participated in weight loss program in the past 6 months. Bariatric surgery Psychiatric conditions, substance abuse, metastatic cancer, stroke, or cardiac arrest.</p> <p>Attrition: A lot of the participants were lost to follow up. It ranges from 35-60% in the different groups.</p>	<p>incentives over 6 months for participating in weight loss therapies.</p> <p>Outcome directed incentive group: the participants received incentive depending on weight loss achieved.</p>	<p>- Neighborhood Environment Walkability Scale- has good construct validity and 0.91 score for reliability</p> <p>- Household Food Security Scale- has a reliability of 0.87 and found to be valid</p> <p>- Consumer financial well-being questionnaire- has a reliability of 0.89</p>		<p>outcome-based incentive group. At 12 months, percentage of patients that lost at least 5% body weight was 31.3% in the usual care, 41.9% in the goal directed incentive group and 41.4% in the outcome-based incentive group.</p>	<p>income neighborhoods.</p> <p>Feasibility: The study is going to be expensive to replicate unless there are grants available to replicate the study in primary care.</p> <p>Application: Financial incentives can serve as a motivation for weight loss in obese people, especially in the lower income population.</p>
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Table A2: Synthesis Table

Study (Author, year)	Clemes et al., 2022	Hoerster et al., 2022	Lambert et al.,2022	McRobbie et al.,2019	Lee et al., 2021	Katzmarzyk et al., 2020.	Katzmarzyk et al., 2021.	Oddone et al., 2018	Slater et al., 2022.	Ladapo et al. 2023.
Design	Cluster RCT- level 2	RCT level 2	RCT level 2	RCT level 2	RCT level 2	RCT level 2	Cluster RCT level 2	RCT level 2	Cluster RCT level 2	RCT level 2
Sample										
SS	382	511	222	330	667	803	2210	417	695	668
Mean-Age(years)	48	57.4		45	40	40.5	52.4	56	45.6	47.69
	years									
Male(%)	99	55		30				85	21	
Female (%)				70	67.2	84.4	79.6		79	81
White (%)		79.9		40	74.1		71.6			
Black (%)						67.2	67.4	40		99
Educated (%)					60.1					
Employed (%)				49	62.6					
Setting										
Primary care clinic	×	×	×	×	×	×	×	×	×	×
Interventions										
Structured education	×		×		×			×	×	
Behavioral lifestyle intervention		×				×	×			
Nurse provided information				×						
Task cards				×						
Financial incentive										×
Goal setting			×							
Social support			×						×	
Health coaches		×			×	×	×	×		
Self-paced online	×	×	×		×					
Telephone sessions							×			
Face to face session							×			
Outcomes/ Themes										
Daily step count										
Sitting time			↓							
Body weight		↓		↓		↓	↓		↓	↓

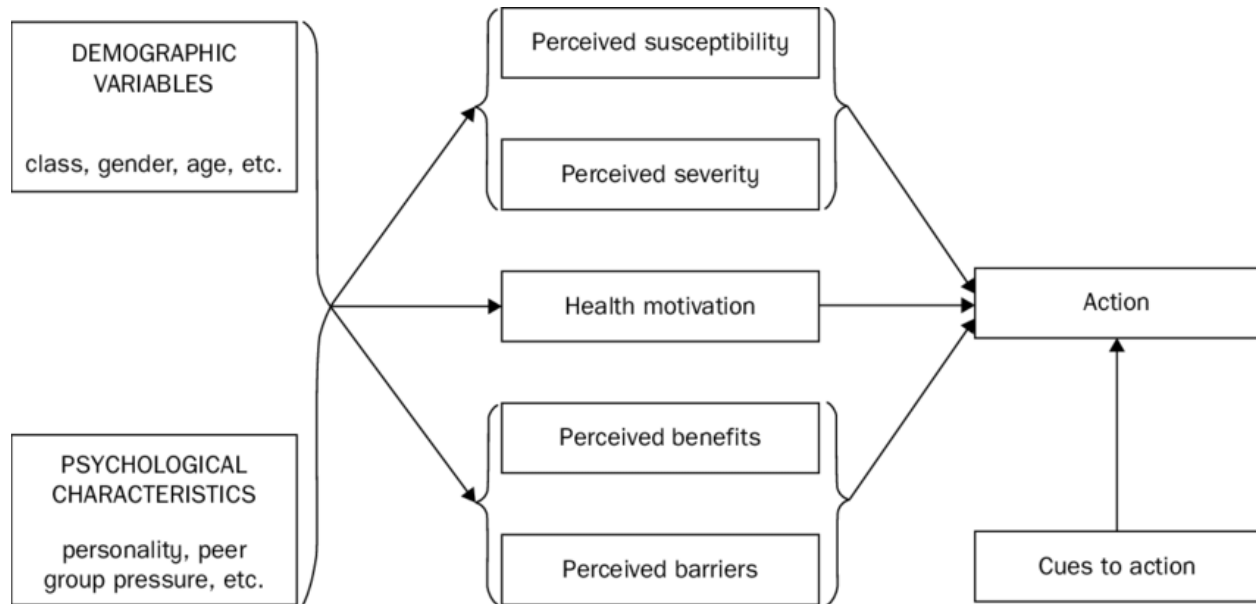
LOE- Level of Evidence, RCT- Randomized Control Trial, SS- Sample size, ↑ - Increased in number, ↓ - decreased in number, ➡ - no change.

Study (Author, year)	Clemes et al., 2022	Hoerster et al., 2022	Lambert et al.,2022	McRobbie et al.,2019	Lee et al., 2021	Katzmarzyk et al., 2020.	Katzmarzyk et al., 2021.	Oddone et al., 2018	Slater et al., 2022.	Ladapo et al. 2023.
Waist circumference				↓		↓			↓	
Physical Health Status		↓								
Minutes of physical activity			↑							
Increased knowledge of diet, exercise, skill	↑			↑				↑		
Wellbeing					↑					
Cardiovascular risk								➡		

LOE- Level of Evidence, RCT- Randomized Control Trial, SS- Sample size, ↑ - Increased in number, ↓ - decreased in number, ➡ - no change.

Appendix B

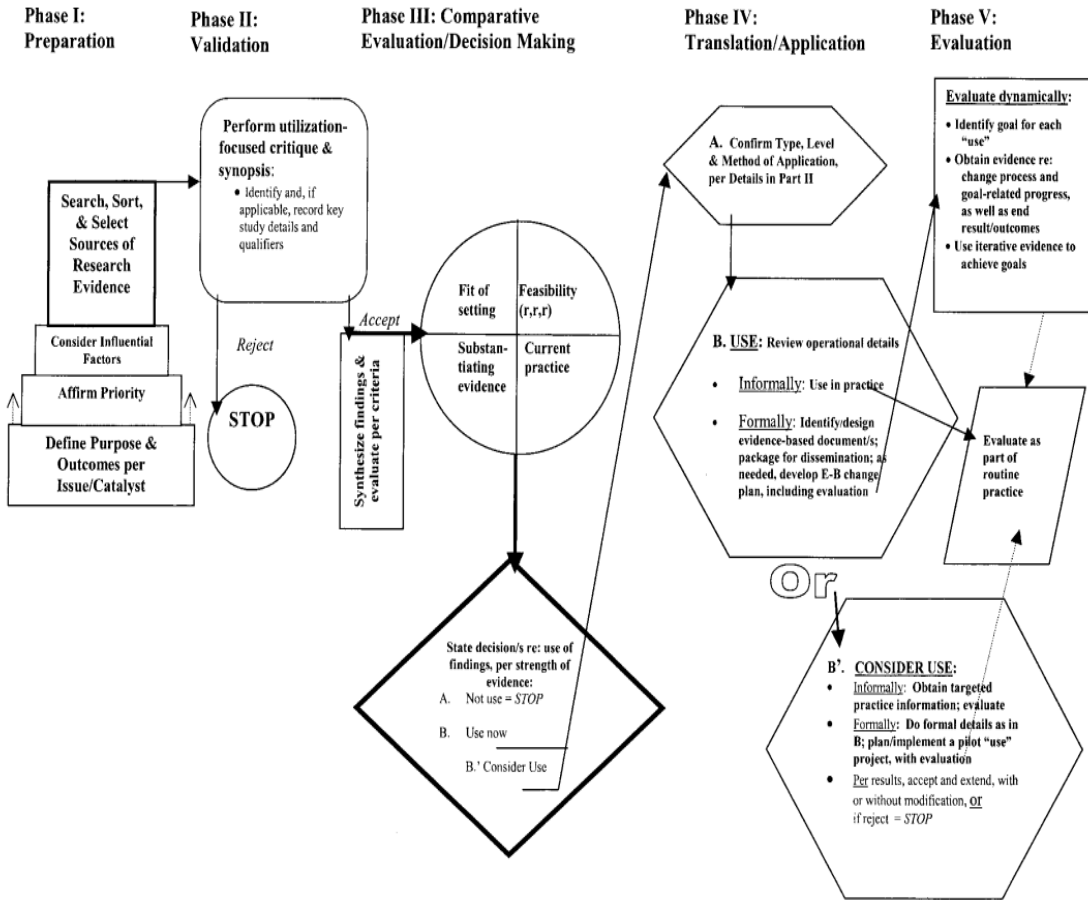
Health Belief Model



(Abraham and Sheeran, 2015)

Appendix C

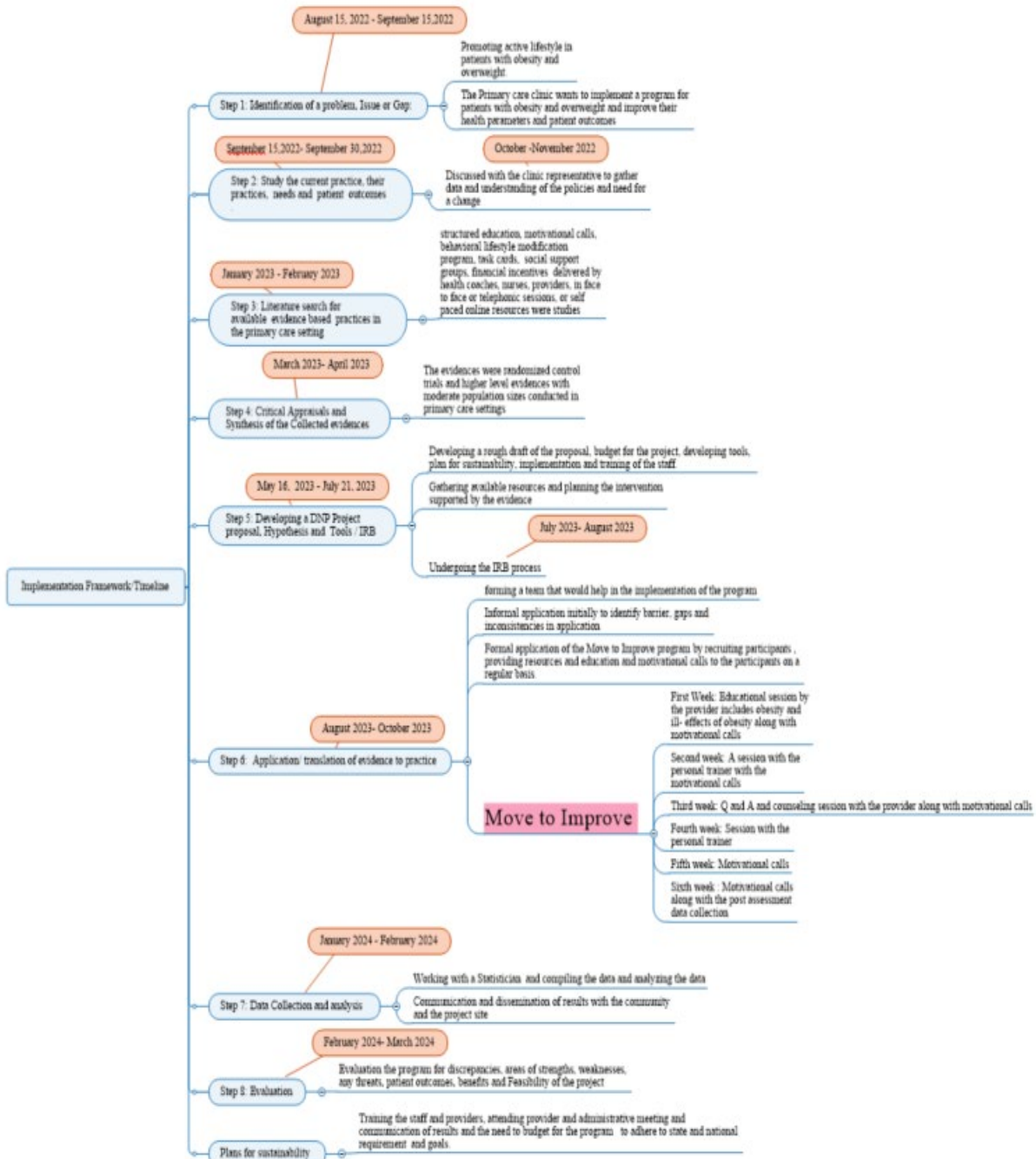
Stetler Model of Research Utilization



(Stetler, 2001)

Appendix D

Project Design and Timeline



Appendix E

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

Demographics: We would like to know more about you. Please put a *check mark* to what applies to you.

Age: _____ years

Gender: Male _____ Female _____

Ethnicity: _____ Caucasian/ White
_____ Black/ African American
_____ Asian
_____ Hispanic/ Latino
_____ Native American/ Island Pacific
_____ Other: specify _____

Insurance: _____ Private
_____ Medicare/ Medicaid
_____ Access
_____ Uninsured

Number of days a week you exercise: _____

Reason for not exercising:
_____ Weather condition
_____ Lack of time
_____ Not interested.
_____ Fear of falling
_____ Depression/Lack of energy
_____ Other: Specify _____

Weight: _____

Waist Circumference: _____

Exercise time per day:

Exercise days per week:

Preferred format of education:
_____ Zoom
_____ In-person
_____ Self-paced online

We are interested in finding out about the kinds of physical activities that people do as part of

their everyday lives. The questions will ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise, or sport.

Think about all the vigorous and moderate activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

Do you currently have a job or do any unpaid work outside your home?

Yes

No



Skip to PART 2: TRANSPORTATION

The next questions are about all the physical activity you did in the last 7 days as part of your paid or unpaid work. This does not include traveling to and from work.

During the last 7 days, how many days did you do vigorous physical activities like heavy lifting, digging, heavy construction, or climbing up stairs as part of your work? Think about only those physical activities that you did for at least 10 minutes at a time.

_____ days per week

No vigorous job-related physical activity



Skip to question 4

How much time did you usually spend on one of those days doing vigorous physical activities as part of your work?

_____ hours per day

_____ minutes per day

Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads as part of your work? Please do not include walking.

_____ days per week

No moderate job-related physical activity



Skip to question 6

How much time did you usually spend on one of those days doing moderate physical activities as part of your work?

_____ hours per day

_____ minutes per day

During the last 7 days, on how many days did you walk for at least 10 minutes at a time as part of your work? Please do not count any walking you did to travel to or from work.

_____ days per week

No job-related walking



Skip to PART 2: TRANSPORTATION

How much time did you usually spend on one of those days walking as part of your work?

_____ hours per day

_____ minutes per day

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

During the last 7 days, on how many days did you travel in a motor vehicle like a train, bus, car, or tram?

_____ days per week

No traveling in a motor vehicle



Skip to question 10

How much time did you usually spend on one of those days traveling in a train, bus, car, tram, or other kind of motor vehicle?

_____ hours per day

_____ minutes per day

Now think only about the bicycling and walking you might have done to travel to and from work, to do errands, or to go from place to place.

During the last 7 days, on how many days did you bicycle for at least 10 minutes at a time to go from place to place?

_____ days per week

No bicycling from place-to-place →

Skip to question 12

How much time did you usually spend on one of those days to bicycle from place to place?

_____ hours per day

_____ minutes per day

During the last 7 days, how many days did you walk for at least 10 minutes at a time to go from place to place?

_____ days per week

No walking from place-to-place →

Skip to PART 3: HOUSEWORK,

HOUSE MAINTENANCE, AND CARING FOR FAMILY

How much time did you usually spend on one of those days walking from place to place?

_____ hours per day

_____ minutes per day

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the last 7 days in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, chopping wood, shoveling snow, or digging in the garden or yard?

_____ days per week

No vigorous activity in garden or yard → *Skip to question 16*

How much time did you usually spend on one of those days doing vigorous physical activities in the garden or yard?

_____ hours per day
_____ minutes per day

Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate activities like carrying light loads, sweeping, washing windows, and raking in the garden or yard?

_____ days per week

No moderate activity in garden or yard → *Skip to question 18*

How much time did you usually spend on one of those days doing moderate physical activities in the garden or yard?

_____ hours per day
_____ minutes per day

Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate activities like carrying light loads, washing windows, scrubbing floors, and sweeping inside your home?

_____ days per week

No moderate activity inside home → *Skip to PART 4:*

RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

How much time did you usually spend on one of those days doing moderate physical activities inside your home?

_____ hours per day
_____ minutes per day

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise, or leisure. Please do not include any activities you have already mentioned.

Not counting any walking you have already mentioned, during the last 7 days, on how many days did you walk for at least 10 minutes at a time in your leisure time?

_____ days per week

No walking in leisure time



Skip to question 22

How much time did you usually spend on one of those days walking in your leisure time?

_____ hours per day

_____ minutes per day

Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do vigorous physical activities like aerobics, running, fast bicycling, or fast swimming in your leisure time?

_____ days per week

No vigorous activity in leisure time



Skip to question 24

How much time did you usually spend on one of those days doing vigorous physical activities in your leisure time?

_____ hours per day

_____ minutes per day

Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis in your leisure time?

_____ days per week

No moderate activity in leisure time



Skip to PART 5: TIME SPENT

SITTING

How much time did you usually spend on one of those days doing moderate physical activities in your leisure time?

_____ hours per day

_____ minutes per day

PART 5: TIME SPENT SITTING

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

During the last 7 days, how much time did you usually spend sitting on a weekday?

_____ hours per day
_____ minutes per day

During the last 7 days, how much time did you usually spend sitting on a weekend day?

_____ hours per day
_____ minutes per day

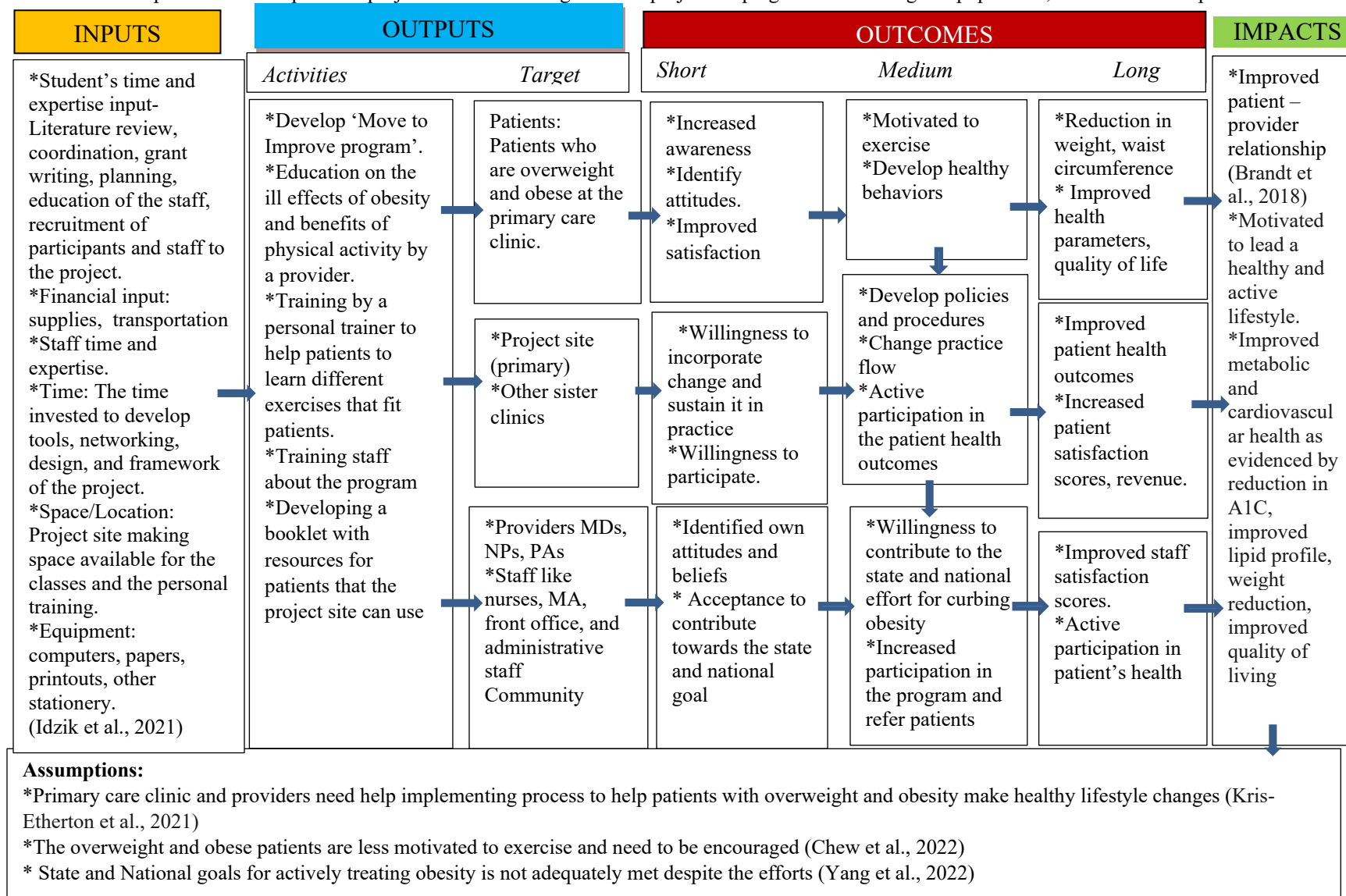
This is the end of the questionnaire, thank you for participating.

(International physical activity questionnaire – long form, 2015)

Appendix F

Figure 1. Logic Model: Move to Improve

Goals: To develop a clear roadmap for the project and a flow that guides the project keeping in mind the targeted population, outcomes and impacts intended.



Appendix G

Budget: Move to Improve

Budget Titles	Expense Items	Total Costs	Cash expense (non-waved)	Waved by sources
Direct Costs	Materials supplies: A4 paper/ Pens/ Printing cartridges /toners	\$75+ \$30+\$45=150	\$150	
	Printing the fliers (0.5\$ each piece), Copies of informed Consents, and information	\$50 + \$30= \$80	\$80	
	Printing of the Brochure of information	\$50	\$50	
	Gas for transportation	\$100	\$100	
	Weighing machine and measuring tape.	\$15+ \$5= \$20	\$20	
	Reward for the walking challenge (gift card)	\$200	\$200	
	Water bottles	\$200	\$200	
	Ankle and wrist weight (\$10 per piece for 20 participants)	\$200	\$200	
	Resistance Bands (\$10 per piece for 20 participants)	\$200	\$200	
	Total Direct Cost	\$1200	\$1200	
Indirect costs	Student time and expertise(50\$/hour) 5 hour /week for 12 months (includes expense for planning the project/ IRB/Implementation/ data analysis)	\$13000		\$13000 by the student
	Health practitioner time for the sessions designed in the Move	\$100 X 2= \$200		\$200 by the health practitioner

	to improve program (100\$ per session)			
	Personal Trainer sessions (\$50 per session)	\$50X 2= \$100	\$100	
	Health Coach time for motivational calls (\$10 per participant for 20 participants)	20 X 10= \$200		\$200 By the student
	Space rent for participant recruitment and project activities.	\$500		\$500 by the project site
	Total Indirect Cost	\$14000	\$100	
Potential Funding Sources	Individual Donation	None yet		
	Eli Lilly company (In the process of application)	0 so far		
	Total Funding		\$0	
Potential Revenue/ Cost Savings to the Site	Medicare services and insurances will pay for Obesity counseling and education (\$52-\$67 for 30 min preventive medicine counseling and risk reduction intervention)	\$1040-\$1340 For 20 participants		
	Time and Expertise of a Health care professional to search for evidence and the development of implementable program at the project site/ data collection and analysis (2 months dedicated time and payment of two monthly salary)	\$5000 X 2 months=\$ 10000		
	Better insurance reimbursements for a better patient health	Unable to predict as it is different for		

	outcome score (Improved Healthcare Effectiveness and Data and information Set - HEDIS score)	different insurances		
	Total Site Revenue	\$11340+	\$11340 +	
Total Project Expenses : \$14770 Waved Expenses (In-kind Support): \$13900 Cash Expenses: \$1300 Total Revenue (Projected): \$11340+				