Physical Activity for Pregnant Women with Diabetes

Siara M. Campbell

Edson College of Nursing and Health Innovation, Arizona State University

Author Note

Siara M. Campbell is a graduate student of the Edson College of Nursing and Health Innovation at Arizona State University. She is also a registered nurse at Abrazo Arrowhead, Glendale, Arizona, in the Postpartum/Couplet Care department.

I have no known conflict of interest to disclose.

Correspondence concerning this article should be addressed to Siara M. Campbell, Edson College of Nursing and Health Innovation, Arizona State University, 550 N. 3rd Street, Phoenix, AZ 85004, email: smmart60@asu.edu

Abstract

Many pregnant women have pregestational diabetes or develop gestational diabetes (GDM), which is on the rise annually. Physical activity (PA) combined with nutrition is a first-line treatment for managing blood sugars. Less than 40% of women achieve 150 minutes of exercise per week during pregnancy. High-quality evidence from literature research reveals that education about physical activity recommendations and instructions on achieving 150 minutes of moderate-intensity exercise most days of the week benefits GDM women. The Self-Efficacy Theory concepts will help apply the evidence to a clinical universal practice change. The practice change will be implemented using the Iowa Model of Evidence-Based Practice to Promote Quality Care. This underscores the importance of integrating physical activity into prenatal care to optimize maternal and fetal health outcomes. Providers within a women's health clinic at a federally qualified health center organization were educated on the universal practice change piloted program. Providers offered a structured four-week walking plan to diabetic pregnant women that is set to guide participants towards a gradual increase in PA to the recommended 150 minutes per week by the fourth week. Using descriptive statistics, the results show that the walking plan had an impact on walking minutes, and a gradual increase in exercise is sustainable. The addition of a walking plan in diabetic prenatal care is an effective strategy for meeting PA recommendations during pregnancy.

Keywords: Pregnancy, diabetes, physical activity, walking, adherence

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The prevalence of pregnant women with pregestational diabetes (PDM), including Type 1 and Type 2 diabetes, and those who develop gestational diabetes mellitus (GDM) is on the rise annually. Diabetes is a pressing health condition that presents multifaceted challenges and is a significant contributor to adverse maternal health outcomes. Managing the body's physiologic changes during pregnancy can burden women, impacting maternal and fetal health outcomes. Physical activity (PA) positively impacts pregnant women with diabetes as it is a beneficial component of comprehensive prenatal care. A systematic review of ten quantitative studies (see Appendix A, Figure A1) focused on physical activity interventions among female participants, primarily pregnant women and those diagnosed with GDM. The studies selected for their high levels of evidence and minimal bias indicated that implementing physical activity plans significantly increased weekly activity minutes (see Appendix A, Figure A2). This project was designed to resemble the evidence synthesis in developing a walking calendar plan for pregnant women with diabetes.

Background and Significance

Managing diabetes becomes more complex during pregnancy. The balance of maternal health influences both maternal and fetal outcomes. Physical activity has emerged as a vital aspect of managing diabetes during pregnancy. Promoting an active lifestyle during pregnancy impacts maternal glycemic control and a woman’s overall well-being.

Pregnant Women with Diabetes

There are more pregnant women each year with pregestational diabetes mellitus (PDM) and gestational diabetes mellitus (GDM). PDM is defined as those diagnosed with diabetes, Type 1 or Type 2, before becoming pregnant. GDM is defined as the development of diabetes during

pregnancy at 24 weeks gestation or later, typically diagnosed at 24 to 28 weeks gestation (American College of Obstetricians and Gynecologists [ACOG], 2018). Gregory and Ely (2023) mark in the 2023 National Vitals Statistics Reports that from 2016 to 2021, the number of births to mothers with pregestational diabetes per 1,000 births jumped from 8.6 to 10.9 in the United States, an increase of 27%. In Arizona specifically, PDM increased by 38% from 2016 to 2021, which is higher than the national average. They also reveal that for women who developed gestational diabetes, there was a 30% increase in the United States from 2016 to 2020, with over a quarter-million women diagnosed with GDM in 2020 alone. Arizona had an increase of 25% in the same four years, comparable to the national inflation of GDM (Gregory & Ely, 2022; Gregory & Ely, 2023).

Physical Activity

There are a variety of exercises and strategies to meet the national recommendation of 150 minutes of physical activity per week. There are no explicit guidelines for the type of exercise that pregnant women with GDM should participate in. For all women during pregnancy, moderate-intensity exercises that have been extensively studied to meet the safety and intensity guidelines are walking, stationary cycling, jogging, dancing, resistance training, swimming, water aerobics, and stretching exercises (ACOG, 2020; US Department of Health and Human Services, 2018). Davenport (2020) writes on behalf of the American College of Sports Medicine that they support this recommendation to incorporate 150 minutes of these exercises while considering safety precautions. Maintaining adequate nutrition and hydration, avoiding exercises in extreme heat conditions or with fall risks, and avoiding contact sports are the most important things for any pregnant woman to consider with physical activity (ACOG, 2020; Davenport, 2020).

It is advisable to educate women who were routinely inactive before pregnancy to begin exercise at a low intensity and short duration, then gradually progress by taking small steps to increase physical activity (ACOG, 2020; Davenport, 2020). Talking with patients about safe exercises, advantages, and how to modify physical activities is appropriate. It's also important to review the safe weight limits for lifting in occupational lifting jobs (ACOG, 2020; MacDonald et al., 2013; US Department of Health and Human Services, 2018). Many women in occupations that require frequent lifting or walking request a note from their provider to restrict their activity at work. In some circumstances, this is necessary, but for women managing diabetes, limiting their daily movements may do more harm than good.

Internal Evidence

In a Federally Qualified Health Center in a Women's Health Clinic and Maternal-Fetal Medicine practice in the Southwestern United States, there is no explicit standard of care for educating, implementing, or holding pregnant women accountable for exercising. Providers in the Women's Health Department or Registered Dietitians conduct the initial counseling sessions for diabetic care. They emphasize their counseling on the value of lower blood sugars, self-monitoring of blood glucose levels, and suitable diabetic diets. They occasionally include generalized statements about physical activity, exercise, or not being sedentary during pregnancy. At every prenatal visit, the healthcare providers review and record the reported blood sugars and offer dietary change suggestions if necessary but rarely readdress PA and non-sedentary behaviors.

PICO Question

A literature review led to the clinically relevant PICO question: “In women with diabetes in pregnancy, does implementing a physical activity plan affect adherence to regular exercise compared to standardized practice?” and led to the following exhaustive search.

Search Strategy

The search strategy involved a thorough review of the most current evidence and literature. The exhaustive search was performed in electronic databases, including PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and the Cochrane Library. These databases were selected based on their high level of evidence in medical literature and other healthcare specialties and their relevance to the PICO question. All three databases generated pertinent and related articles. Keywords used included *pregnancy*, *gestational diabetes*, *GDM*, *physical activity*, *exercise*, *interventions*, *adherence*, *compliance*, and *guidelines*.

The keyword combination of *gestational diabetes* and *exercise* or *physical activity* and *guidelines* yielded 217 in PubMed, 98 in CINAHL, and 125 in Cochrane Library. The search was narrowed to include only studies in the last five years (2019-2024), English language, and research articles. The geography filter was left out. This yielded a total of 11 studies in PubMed, 31 studies in CINAHL, and 55 studies in the Cochrane Library. With the same filters, another keyword combination of *GDM* and *exercise* and *interventions* resulted in 71 studies from PubMed, 50 studies in CINAHL, and 97 in Cochrane Library.

Studies were included that were published within the last five years, from 2019 to 2024, written in English, and had a population of women older than 18. Studies from several countries were included if available in English. The exclusion of studies were those published before 2019, not a primary search, qualitative, or not written in English.

After a critical appraisal, 10 studies were selected to be included in an exhaustive literature review based on the highest level of evidence studies. These studies evaluated types of physical activity, adherence to exercise, and the effects of physical activity on women with diabetes in pregnancy. Other grey literature databases were searched, including government publications from the Centers for Disease Control and Prevention (CDC) and ACOG. ACOG is used for clinical practice guidelines.

Evidence Synthesis

The quality of studies and the level of evidence were determined according to the rapid critical appraisal tools and questions regarding validity, reliability, and applicability (Melnyk & Fineout-Overholt, 2019). Ten studies were included in the final analysis (see Appendix A, Table A1). The evaluation included examining the study design, variables, assessment tools, and findings. All 10 studies chosen were quantitative data. Eight studies were randomized control trials (RCT), one secondary analysis RCT, and one systematic review. The studies had high levels of evidence and were conducted with minimal to no bias. All studies included female participants. The majority of the studies involved participants who were pregnant; half of those studies were women diagnosed with GDM. Eight of the ten studies created an intervention focusing on a PA/workout plan. The two studies that included an older population of non-pregnant participants also demonstrated the benefit of the PA/workout plan intervention across other vulnerable populations.

Study populations ranged from 26 to 500, while the systematic review included 6,242 participants. The most consistent tool used was the Borg Rating of Perceived Exertion. Half of the studies used the Self-Efficacy Theory as the framework for the study. The significant results of the studies were then synthesized for comparison (see Appendix A, Table A2). The key

finding was that incorporating a PA plan increased the overall PA minutes of participants per week. The strengths of the studies were the variety of ethnicities, organization of the control and intervention groups, manageable exercises, and involvement of education. The general weaknesses between the studies were the self-reported measurement tools of logging exercises. However, this is a strength as it is a feasible measurement capability for the Federally Qualified Health Center patients.

Purpose Statement

Given the rise in the prevalence of diabetes in pregnancy and the associated complications and costs linked to uncontrolled blood sugars, it is essential to integrate physical activity into prenatal diabetes care plans. Evidence supports the benefits of physical activity in preventing complications of gestational diabetes and effectively controlling blood sugars. Despite this, a small percentage of pregnant women stay committed to consistent physical activity throughout pregnancy. This project aims to increase physical activity for pregnant women with diabetes.

Theoretical Framework Application

The Self-Efficacy Theory (see Appendix B, Figure B1) is used as a framework application for this project. The theory of self-efficacy refers to the belief and confidence in one's ability to perform a specific task and behavior successfully (Bandura, 1997). The four main components of self-efficacy are performance outcomes, vicarious experience, verbal encouragement, and physiological arousal (see Appendix B, Figure B1). The self-efficacy theory applied to pregnant women with diabetes can guide interventions to increase physical activity. Pregnant women can enhance their confidence in managing their health through tailored exercise programs and supportive guidance to achieve PA goals. This approach will enhance blood

glucose control and physical well-being by fostering a positive mindset within these women to improve pregnancy outcomes. Setting attainable goals and examples and offering support and resources can improve self-efficacy. If the information provided to pregnant women is positively driven, there should be a higher likelihood of achieving PA self-efficacy (Bandura, 1997). This theory will be beneficial to help develop appropriate interventions to promote PA during pregnancy and adherence to PA long-term.

Implementation Framework

The Iowa Model of Evidence-Based Practice to Promote Quality Care (see Appendix B, Figure B2) is used for project implementation. The first step of this model is to recognize a clinical issue, either clinic- or patient-identified. In this case, the issue identified by the clinic was the insufficient PA undertaken by women with GDM on a weekly basis. It was deemed priority enough to warrant efforts aimed at improvement. The next step was assembling evidence on the topic, critiquing, and synthesizing the research findings. There is sufficient research with high levels of evidence to support the goal of changing the level of PA in women with diabetes. Objective baseline data was collected, and the intervention was implemented into the practice. The intervention had outcomes to be achieved, including uptake of PA, knowledge about the benefits of PA in women with pregnancies complicated by diabetes, and adherence to a lifestyle change with non-sedentary behaviors. The outcomes will determine whether this intervention will be incorporated into future practice. If it is deemed appropriate for adoption, initiation of change in practice or continued evaluation of quality will follow, along with dissemination of results (Titler et al., 2001).

Project Methods

Four ethical principles guided this project: respect for autonomy, justice, beneficence, and nonmaleficence. Respect for autonomy is defined as the ethical duty to respect the choices that others make for their health (Fowler & American Nurses Association [ANA], 2015). The project adheres to this principle by empowering participants to make decisions during the intervention. This was applied to the project by providing detailed information on the walking plan intervention, the benefits, and potential risks giving them free choice to participate, and providing them with an unidentifiable identification number (Fowler & ANA, 2015). The project also adheres to the principle of justice. Justice is the distribution of fairness or equal distribution of benefits, as well as not denying without good reason (Fowler & ANA, 2015). The project adhered to this principle by continuing to provide support, access to the clinic resources, and distribution of the walking exercise regardless of socioeconomic status and geographic location (Fowler & ANA, 2015). Specifically, this was applied by offering the intervention free of charge and allowing for flexibility in how the walking minutes are obtained, whether inside or outside. Beneficence is an obligation to do no harm, maximize benefits, and minimize possible harm (Fowler & ANA, 2015). The project adheres to this beneficence principle by aiming to improve maternal and fetal health outcomes through evidence-based guidance. Application of this in the project included providing ongoing education on the benefits of physical activity for managing blood sugar levels and education on ensuring personal safety. Nonmaleficence is the final principle defined as the responsibility to not inflict harm upon someone (Fowler & ANA, 2015). The project adheres to this principle by prioritizing the safety of the participants. This was applied by providing participants with clear guidelines on exertion level to prevent overexertion and physical warning signs to withdraw from current walking activity. A logic model was created to plan for this quality improvement project's potential inputs, outputs, outcomes, and

impacts (see Appendix C). The Institutional Review Board (IRB) at Arizona State University reviewed the project methodology to ensure that ethical principles are followed and that participants' human rights are protected throughout the project. The IRB approved the project for expedited human subject protection before project implementation.

Setting and Participants

In a federally qualified health center in a Women's Health Clinic and Maternal-Fetal Medicine (MFM) practice in the United States. The two aspects of participants are the providers within the Women's Health Clinic and the established patients of the clinic. Since this is a universal practice change being piloted at one location of the federally qualified health center organization, all providers in the women's health clinic must participate and offer the physical activity intervention to all eligible patients. The providers have varying credentials, including but not limited to Certified Nurse Midwives, Nurse Practitioners, Doctor of Nursing Practice, Doctor of Osteopathic Medicine, and Doctor of Medicine (see Appendix D, Figure D1). The inclusion criteria for the patients are females 18 years or older seen in the Women's Health department at the one clinic site, English- and Spanish-speaking, and have a diagnosis of diabetes during pregnancy, including pregestational and gestational diabetes.

Project Intervention

For the standardized change in practice, the provider will fill out the first page of the "Pregnancy Walking Log" document for any patient meeting the inclusion criteria to track the patient demographics (see Appendix D, Figure D2). Then, the patients will receive the second page of the "Pregnancy Walking Log - English" document (see Appendix D, Figure D3) or the "Pregnancy Walking Log - Spanish" document (see Appendix D, Figure D4). The standardized practice change is a four-week calendar offering a walking plan. Walking can be performed in

any form, including but not limited to walking around the house, place of employment, or other building, inside on a treadmill, or outside. The walking plan includes the number of days and minutes per day/week. The number of minutes of walking goal increases by 25 minutes each week. Walking exercise is suggested to be spread across five different days each week. The goal in the first week is 15 minutes over five days for a total goal of 75 minutes. The goal in the second week is 20 minutes over five days for a total goal of 100 minutes. The goal in the third week is 25 minutes over five days for a total goal of 125 minutes. The goal in the fourth week is 30 minutes over five days for a total goal of 150 minutes.

Timeline

The providers within the Women's Health Clinic will implement this piloted universal practice change for a minimum of four months. After a minimum of four months, the DNP Student will verify that all documents are accounted for and collected. Then, there will be a follow-up evaluation with the DNP Student.

Data Collection Plan

The data collection plan involves de-identified intervention document records prior to analysis to ensure participant confidentiality. The data points to be collected will include the variables of the healthcare providers, including their age and credentials, as well as the patients' demographics of age, ethnicity, and insurance status. The total number of minutes of walking completed each week and whether participants achieved the final goal of 150 minutes in the fourth week will also be included in the data collection. The overarching objective of this evaluation is to determine the impact of implementing a walking physical activity plan into the standard of care on adherence to physical activity among pregnant women with diabetes.

Data Analysis Plan

After collecting data from the demographic and walking plan log documents, the information and numbers will be entered into statistical software in a row connected to the provider identification numbers and the participant identification numbers on the papers. All data entries will be ensured to be complete, accurate, and consistent. Descriptive statistics will calculate the mean, median, and range of weekly walking minutes logged by participants. A secondary outcome analysis will use the Pearson correlation coefficient to assess correlations between adherence with weekly walking minutes and demographics.

Budget

The project budget includes a few essential items to ensure effective implementation (see Appendix E). A portion of the budget was allocated for a provider educational meeting, where providers were compensated with lunch. Additionally, funds covered the cost of the demographic documents for providers, 100 pregnancy walking log documents in English, and another 100 in Spanish. The budget included costs for translation services to convert the intervention materials into Spanish and back into English to verify the accuracy of the translation. A storage bin was purchased for collection to support the organization of these documents. Lastly, a stapler and staples were included to ensure that appropriate documents stayed together.

Results

Intellectus Statistics software was used to store, manage, and analyze data (Intellectus Statistics, 2023). There were 16 patients recruited, of which two participated in the walking plan. The sample consisted of diabetic pregnant women (n = 2). One completed the study, and the other completed 2 weeks and a few additional days in week 3. One was private pay. One was uninsured/self-pay. One was white/Caucasian. One was Hispanic. Both subjects were English-speaking. The average age of the sample was 34 (SD = 2.83).

The healthcare providers provided the walking plan documents and the instructions related to the study. The majority of providers were either MD and DNP 4 (44%), NP 3 (33%), and the other two were PA or Midwife and NP (22%) (see Appendix F, Table F1). The average age of providers was 38 (*SD* = 11.29), and the ages ranged from 26 to 53 years of age (see Appendix F, Table F2).

Descriptive statistics were calculated for the outcome variable of walking time in minutes for week 1 through week 4 for two subjects (see Appendix F, Table F3, and Table F4). Subject 1 completed the four weeks of the walking plan intervention. Subject 2 completed two weeks and a few additional days in week 3. Subject 1 completed 20, 35, 50, and 50 minutes in total per week over a four-week period. Subject 2 completed 690, 688, 193, and 0 minutes in total per week over a four-week period. Subject 1 sustained four weeks of walking and demonstrated a gradual increase in walking minutes for three weeks. Yet, she did not achieve the clinical practice guidelines of 150 minutes of exercise per week. Subject 2 started walking an excess number of minutes per week and walked fewer total minutes per week. Yet, she achieved the clinical practice guidelines of 150 minutes of exercise per week for three consecutive weeks.

Clinical Significance

Although the study provided some insight, the results were not clinically significant. The insufficient sample size limits the reliability and generalizability of the findings. Due to the sample size, the results lack the strength needed to impact clinical practice. Due to the inconsistency of the observed effect, the evidence is inadequate to support an impact on patient care or health outcomes or to suggest meaningful improvements.

Impact of Project

Although the project did not achieve clinically significant results, it highlighted important areas for improvement in promoting physical activity among diabetic pregnant women. The insufficient sample size and inconsistent results restricted the ability to demonstrate a strong impact on patient care, health outcomes, or provider practice. However, it can be inferred from the data collected that the introduction and discussion of a structured walking plan had an influence on participants' PA behaviors, as evidenced by the recorded walking minutes of the two subjects. Even though one participant did not complete the full four-week intervention, the engagement suggests that education about physical activity can positively impact patient behavior, underscoring the value of provider-patient discussions.

At the provider, system, and policy levels, the project's impact was minimal due to the small scale and lack of strong, consistent outcomes. At this point, without sufficient evidence, it would be challenging to broaden the universal practice change across the other project organization clinic locations. The underlying rationale for this project to influence physical activity among diabetic pregnant women is already supported at the system and policy levels. However, it is not sufficiently prioritized or routinely monitored within the clinical organization.

Sustainability

The current structure of the intervention, as implemented for the project, would not be sustainable in everyday clinical practice. Additional steps, such as demographic tracking and manual data collection, were necessary for project evaluation but would not be essential to track in routine use. To enhance sustainability, a digital version of the four-week walking plan calendar could be developed, allowing providers and patients to easily log and monitor walking activity. Integrating the walking plan into an electronic health record system or using a mobile application would streamline documentation, reduce the risk of lost paperwork, and promote

more consistent provider and patient engagement, making the intervention more feasible and sustainable in clinical settings.

Discussion

Summary of Findings

The first-line treatment to manage diabetes in pregnancy is lifestyle modifications, including dietary changes and PA, but exercise is routinely neglected. This project provided an intervention consisting of a four-week structured walking plan to increase PA for sedentary diabetic pregnant women. Amongst the two active participants, there was an increase in walking minutes, but they took different approaches, one being sustainable and the other overachieving PA clinical practice guidelines. The walking plan can help increase exercise and adherence to guidelines and give healthcare providers a more comprehensive care plan for their diabetic pregnant patients. The current structure of the project is not sustainable, but with digital integration, the walking plan can be a sustainable system change and is feasible to implement across other clinical locations.

Limitations and Barriers

One of the limitations of the project was managing the physical walking plan papers, which made it challenging to keep track of important documents and information efficiently. Throughout the four-week period, participants lost their papers. The reliance on this paper-based system increased the risk of misplacement and lost patient data that could not be collected. Additionally, the project was limited by the lack of continuity of provider-patient relationships. There were often gaps in communication and follow-up discussion of the walking plans due to patients often seeing multiple providers across many location sites. Providers also had limited

time in their patient visits, which impacted the number of participants recruited to trial the walking plan. This time pressure hindered the overall impact of the project.

Findings Relative to Literature

The increased physical activity among participants who returned their logged structured walking plan similarly aligns with findings from recent research. An infographic intervention was shown to increase knowledge and self-efficacy regarding exercise in the GDM population (Harrison et al., 2020). Additionally, it has been demonstrated that providers can set goals for patients to gradually increase their walking and PA over time (Patel et al., 2021). Further evidence supports that initiating motivational interviewing alongside a structured PA plan is more effective in increasing motivation, self-efficacy, and overall PA than standardized care (Knudsen et al., 2024). This project's outcomes contribute to the growing body of literature supporting structured interventions to promote PA.

Future Study Recommendations

Recommendations to further this study and research are to integrate digital applications to support providers and pregnant women with diabetes. Incorporating a structured walking plan calendar into the patient portal and linking it to the electronic health record would allow patients to easily track their progress and update their providers in real time. Providing ongoing access to digital walking plans through their portal would promote self-monitoring, enhance patient engagement, and support long-term behavior change. Another recommendation is to develop a required charting template within the EHR that prompts providers to document physical activity counseling at the initial recruitment encounter when starting the walking plan. Additionally, a maintenance template should be created for providers to document revisitation and reinforcement

of the benefits of exercise at each follow-up visit, continuing throughout pregnancy until the patient achieves the clinical practice guideline of 150 minutes of exercise per week.

Conclusion

Developing and implementing a structured exercise plan with clearly defined goals supports pregnant women with diabetes by addressing the common deficit in physical activity during pregnancy. This initiative lays the foundation for future interventions aimed at promoting healthier lifestyles. By applying the evidence to standardize clinical practices, the objective is to increase the number of women who meet the ACOG and CDC guidelines for physical activity during pregnancy. The long-term vision is to facilitate a seamless transition of this structured exercise plan for both patients and providers, allowing for its adaptation across various clinical settings and other pregnancy-related medical conditions. Ultimately, a lifestyle intervention such as this has the potential to significantly enhance quality of life both prenatally and postnatally.

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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
Christie et al., (2024). Diagnosis to delivery: A randomized clinical trial of postmeal walking in women with gestational diabetes. **Country**: Australia **Funding**: NHMRC Investigator Grant and a University of Wollongong SMAH Partnership **Bias**: Selection of the recruitment (exercise-based study)	Implied: Health Belief Model or Theory of Planned Behavior or Self-Efficacy Theory	**Design:** RCT **Purpose:** Determine if advice to perform PMW is a more effective alternative for management of GDM compared to advice to perform standard-care continuous walking	**N=** 26 women at 28-30 WG **CG:** n= 14 **IG:** n= 12 **Demographics:** Pregnant, GDM, >18 years, <30 WG **Setting:** free-living environment with habitual conditions **Exclusion:** High-risk pregnancy (insulin use or contraindications for PA) **Attrition:** 35%	**IV1:** CTL (Standard-care control: continuous walking) **IV2:** PMW **DV1:** Continuous BG monitor **DV2:** PA + adherence **DV3:** birth outcomes **Definitions:** CTL - 150 mins/wk or 30 mins most days of wk PMW - 10 min walk post each meal	**Tools:** Borg Rating of Perceived Exertion Scale Continuous Glucose Monitoring Godin Shepard Leisure-Time PA Questionaire **Validity/ Reliability:** All valid and reliable	**Statistical Tests Used:** Linear Mixed Model (compared BG and PA outcomes) Pearson correlation analysis (PP and PA)	**DV1:** CTL p = 0.04 (PP BG PMW > PP BG CTL) **DV2:** Sedentary time: PMW > CTL (p=0.02) Walking mins per day: CTL > PMW (p=0.05) Adherence between CTL and PMW p = 0.12 **DV3:** p > 0.05	**Level of Evidence**: Level 1 **Strengths**: first to explore PMW, scalable, simple to deliver, adherence **Weakness**: need to mitigate sedentary behaviors for PMW **Feasibility**: It is feasible **Application**: It is applicable; Can educate both PA methods are good, best option is CTL

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Harrison et al., (2020). A consumer co-created infographic improves short-term knowledge about physical activity and self-efficacy to exercise in women with gestational diabetes mellitus: A randomised trial. **Country**: Australia **Funding**: Mercy Health Services Academic Research and Development Committee **Bias**: Minimal; Ethics and funding company the same	Self-Efficacy Theory	**Design:** RCT **Purpose:** To determine if an infographic about GDM improves knowledge about PA and self-efficacy to exercise compared to usual education about GDM	**N=** 69 women **IG:** n= 37 **CG:** n=32 **Demographics:** Singleton pregnancy, GDM, ages 18-40, able to read and write in English **Setting:** antenatal clinic **Exclusion:** high-risk pregnancy, health contraindications to participate in PA **Attrition:** 0.01%	**IV1:** infographic about PA for GDM **DV1:** knowledge about PA during GDM **DV2:** self-efficacy to participate in PA **Definitions:** NA	**Tools:** 19-question questionnaire about PA knowledge Self-Efficacy for Exercise Scale **Validity/ Reliability:** No formal testing; modified based on original questionnaire, 2 guidelines, and extra info; not valid. Possibly reliable since it was modified to reflect PA and guidelines sufficient evidence of validity and reliability	**Statistical Tests Used:** intention-to-treat (95% confidence interval)	**DV1:** increase in knowledge by 12% which is significant (Significance is 10-15%) **DV2:** 2.5-unit improvement in self-efficacy; Significance at 1.9-3.0 unit	**Level of Evidence**: Level 1 **Strengths**: larger sample size, range of ethnicities and cultural backgrounds **Weakness**: English-speaking only **Feasibility**: It is feasible because healthcare clinics often have patient handouts **Application**: It is applicable; can provide a colorful infographic card/paper to provide or show patients

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
McDonald et al., (2022). Influence of prenatal exercise on the relationship between maternal overweight and obesity and select delivery outcomes. **Country:** United States **Funding:** American Heart Association and East Carolina University internal funds **Bias:** Possibly; Review board was from one of the same organizations of funding	Implied: Self-Efficacy	**Design:** Single-blinded, four-arm RCT **Purpose:** Assess the influence of antenatal exercise on the association between maternal BMI, cesarean birth, preterm birth, and neonatal birth weight	**N =** 213 women **CG:** n= 68 **IG 1 (aerobic)**: n= 69 **IG 2 (resistance)**: n= 36 **IG 3 (combination):** n= 40 **Demographics:** low-risk pregnancy, singleton, <16 WG, **Setting:** Obstetric clinic **Exclusion:** No contraindications to exercise, preexisting diabetes, hypertension, cardiovascular disease *women who developed GDM were still included* **Attrition:** 0.04%	**IV1:** type of exercise; all IG PA included 5 min warmup, 50 min moderate-intensity PA, and a 3-5 min cooldown **DV1:** pregnancy outcomes **DV2:** delivery outcomes **Definitions:** NA	**Tools:** Polar FS2C heart rate monitor 15-point Borg rating scale or perceived exertion **Validity/Reliability:** Both tested as good validity; heart rate monitor reliable; unsure of reliability of Borg rating scale	**Statistical Tests Used:** Student's T-test Pearson Chi-Square test Intention-to-treat ANCOVA Poisson regression models	**DV1:** GDM p = 0.71 3% of all IG developed GDM 5% of CG developed GDM **DV2:** WG p= 0.93 Preterm p= 0.80 Cesarean p= 1 Birth weight p= 0.87 Macrosomic p= 0.98	**Level of Evidence:** Level 2 **Strengths:** exercise group had fewer cases of GDM than CG **Weakness:** recruited at or before 16 WK, not only for GDM women; not significant; suddenly compared obesity/overweight with normal weight women; not all DV2 results were from GDM women **Feasibility:** Not feasible - Multiple reasons certified trainers cannot supervise exercise **Application:** The types of exercises may be applied; the number of minutes of exercise may be replicated on smaller scale; Can use Borg rating scale

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Xie et al., (2022). Effects of resistance exercise on blood glucose level and pregnancy outcome in patients with gestational diabetes mellitus: A randomized controlled trial. **Country:** China **Funding:** Quanzhou Science and Technology Plan Project in China **Bias:** None	Implied: Health Belief Model	**Design:** RCT **Purpose:** investigate effect of resistance exercise versus aerobic exercise in patients with GDM	**N =** 100 GDM **IG 1 (resistance PA):** n= 49 **IG 2 (aerobic PA):** n= 51 **Demographics:** GDM, 20-40 age; 24-31 WG, singleton, BMI < 40, **Setting:** obstetric department in general hospital **Exclusion:** previous abortion, participation in other PA programs, severe obstetric contraindications **Attrition:** 14%	**IV1:** resistance exercise/PA **IV2:** aerobic exercise/PA **DV1:** fasting BG **DV2:** 2-hr PP BG **DV3:** pregnancy outcomes **DV4:** compliance to exercise **Definitions:** resistance PA - upper and lower limb flexion and extension exercises aerobic PA - walking and stretching PA- 50-60 mins + 5 mins cooldown x 3 days/week; additional exercise set added each week starting at week 2	**Tools:** Borg Scale (moderate intensity goal about 13-14) Exercise bracelet to monitor heart rate **Validity/Reliability:** Both tested for good validity and reliability	**Statistical Tests Used:** Microsoft Excel 2013 and Statistics software used for data entry and statistical analysis Pair t-tests Fisher's exact test	**DV1:** IG 1: p= 0.043 IG 2: p= 0.031 **DV2:** IG 1: p< 0.001 IG 2: p< 0.001 **DV3:** p = [0.058 - 1.000] difference in PA did not change pregnancy outcomes **DV4:** p= 0.031 resistance PA higher compliance than aerobic PA	**Level of Evidence:** Level 1 **Strengths:** same dietary guidance for each IG, manageable exercises **Weakness:** performed over 6 weeks, BMI < 40 not completely inclusive, compared two forms of PA rather than one PA compared to no PA **Feasibility:** It is feasible **Application:** Yes it is applicable. Both forms of PA can be implimented, increasing PA each week is acceptable, and can be done in variety of settings (home, gym, inside, outside, etc.)

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Nagpal et al., (2020). Sequential introduction of exercise first followed by nutrition improves program adherence during pregnancy: A randomized controlled trial. **Country:** Canada **Funding:** Ontario Graduate Scholarship, Whaley and Harding Fellowship-Children's Health Research Institute and Western Fellowship Program **Bias:** None	Implied: Theory of Planned Behavior or Self-Efficacy Theory	**Design:** RCT **Purpose:** examine adherence to the sequential introduction of nutrition and exercise behaviors during pregnancy compared to a simultaneous approach	**N =** 88 pregnant women **Group A**: n= 17 **Group B:** n= 20 **Group C:** n= 23 **Demographics:** 12-18 WK, >18 age, normal weight or overweight or obese, mostly Caucasian and no African American **Setting:** clinic **Exclusion:** contraindications for exercise, >18 WG, diabetes, smoker, already meeting or exceeding PA guidelines **Attrition:** 20%	**IV1:** Group A received nutrition and exercise simultaneously **IV2:** Group B received nutrition first, then exercise at 25 WG **IV3:** Group C received exercise first, then nutrition at 25 WG **DV1:** Total average adherence to meeting intervention goals of nutrition and exercise **DV2:** gestational weight gain **Definitions:** NA	**Tools:** Adherence scoring Exit survey using Likert scale **Validity/Reliability:** Not test but reliable as the scoring is 1-3 Likert scale moderately valid and moderately reliable	**Statistical Tests Used:** One-way ANOVA Student's T-test	**DV1:** Group C > Group A p= 0.001 Group C > Group B p= 0.028 **DV2:** Group C gained *less* weight than Group B; p= 0.04 Group C gained *more* weight than Group A; p= 0.35	**Level of Evidence:** Level 1 **Strengths:** weekly follow-up, exit survey on participant preference and perceived difficulty of the interventions, same number of face-to-face visits **Weakness:** use of self-reported measurement tools (nutrition and exercise logs) to complete the adherence scoring *although this would be similar to project site* **Feasibility:** It is feasible, dependent on provider if education is done simultaneously or separately **Application:** This is applicable; would be a provider focused intervention possibly

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Rodriquez-Blanque et al. (2020). Water exercise and quality of life in pregnancy: A randomized controlled trial. **Country:** Spain **Funding:** University of Granada College of Nursing and **Bias:** None	Conceptual Framework of Control Theory	**Design:** RCT **Purpose:** To analyze the quality of life in pregnant women who complete a program of moderate physical activity in water	**N =** 140 **CG:** n= 70 **IG:** n= 70 **Demographics:** 21-43 years, 20-37 WG **Setting:** Recruited from women in clinic; exercise completed in pool **Exclusion:** Regularly exercise previously, contraindications of PA, multiparity **Attrition:** 8%	**IV1:** moderate PA in water. 3 sessions per week, each for 60 minutes (warm-up, aerobic element, and final stretching) **DV1:** level of PA **DV2:** perceived health status assessing Health-Related Quality of Life (physical and mental) **Definitions:**	**Tools:** Global Physical Activity Questionnaire Borg rating of perceived exertion scale Short-form health questionnaire **Validity/Reliability:** Global Physical Activity Questionnaire valid and reliable for PA in pregnancy Borg rating tested for good validity and reliability short-form health questionnaire no evidence or support for validity or reliability	**Statistical Tests Used:** Student's T-test Mann–Whitney U test ANOVA	**DV1:** p= 0.008 **DV2:** physical component summary p= 0.001 mental component summary p= 0.016	**Level of Evidence:** Level 1 **Strengths:** equal sample in CG and IG, physical and emotional benefits of moderate activity, pool PA, and program regulation **Weakness:** IG was monitored during PA so women may not hold themselves accountable long term compared to when they were monitored and held accountable **Feasibility:** Yes; women can exercise in the pool but not feasible for health care workers to monitor sessions **Application:** Aerobic/pool PA is safe option and could count towards PA to meet PA guidelines

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Riera-Sampol et al. (2021). Effectiveness of physical activity prescription by primary Care nurses using health assets: A randomized controlled trial. **Country:** Spain **Funding:** Santarias Research Fund of Carlos Health Institute **Bias:** None	Trans-theoretical stage of change	**Design:** RCT; multicentre, single-blinded, parallel **Purpose:** Evaluate effectiveness of a 12-month multifactorial intervention by primary care nurses using health assets in increasing adherence to PA prescription (150 min/week) in patients with two or more cardiovascular risk factors	**N =** 263 **IG:** n= 128 **CG:** n= 135 **Demographics:** Men and women; 35-75 years, at least two cardiovascular risk factors (ex. diabetes, BMI > 30, hypertension, dyslipidemia) **Setting:** 20 primary healthcare centers **Exclusion:** terminal illness, cognitive impairment, untreated/unstable heart disease/failure **Attrition:** 29% (started with 370 randomized into IG and CG)	**IV1:** Motivational interview with beneficial effects of PA and individualized prescription for PA **DV1:** Number of participants performing at least 150 min of weekly PA (adherence) **DV2:** PA levels **Definitions:**	**Tools:** International PA Questionnaire **Validity/Reliability:** All have been demonstrated to have psychometric adequacy and therefore considered as adequate reliability and validity	**Statistical Tests Used:** Student's T-test X^2 test	**DV1:** p= 0.047 adherence to at least 150 min of PA higher in IG **DV2:** p= 0.025 IG higher PA levels and spent more time walking than CG	**Level of Evidence:** Level 1 **Strengths:** Action and follow-up visits, sample population had health conditions, motivational interviewing **Weakness:** Population in study not pregnant nor all female **Feasibility:** Yes; Providers use motivational interviewing and counseling frequently **Application:** Motivational interviewing or setting a "prescription" (plan) for PA can be replicated to increase PA adherence and time spent on PA

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Patel et al. (2021). Effect of goal-setting approaches within a gamification intervention to increase physical activity among economically disadvantaged adults at elevated risk for major adverse cardiovascular events: The engage randomized clinical trial. **Country:** United States **Funding:** Perelman School of Medicine grant and University of Pennsylvania Health System through Penn Medicine Nudge Unit **Bias:** potential	Goal-setting theory	**Design:** RCT **Purpose:** To test the effectiveness of different ways to set and implement goals within a behaviorally designed gamification intervention to increase physical activity	**N =** 500 **Demographics:** Female and male, low socioeconomic status, **Setting:** remote monitoring **Exclusion:** baseline daily step count greater than 10,000, inability to provide informed consent or speak/read/write English), condition that made participation unsafe, already enrolled in another study for PA, or had any medical conditions **Attrition:** 1.2%	**IV1:** Assigned and gradual goal **IV2:** Assigned and immediate goal **IV3:** Choice and gradual goal **IV4:** Choice and immediate goal **DV1:** steps per day **DV2:** minutes of PA per day **Definitions:** Assigned = 2,000 step increase from baseline Choice = self-goal of 1,000 to 3,000 step increase Immediate goal = reach goal beginning on day 1 Gradual goal = reach goal gradually over the 8-week period	**Tools:** Way to Health - a research technology platform at University of Pennsylvania used for remote monitoring and PA interventions **Validity/Reliability:** No current testing on validity or reliability	**Statistical Tests Used:** intention-to-treat-analysis	**DV1:** assigned and gradual goal: p= 0.04 assigned and immediate goal: p= 0.08 choice and gradual goal: p= 0.05 choice and immediate goal: p<.001 **DV2:** assigned and gradual goal: p= 0.18 assigned and immediate goal: p= 0.02 choice and gradual goal: p= 0.11 choice and immediate goal: p= 0.004	**Level of Evidence:** Level 1 **Strengths:** disadvantaged economic individuals **Weakness:** Population not pregnant or all women **Feasibility:** It is feasible because goals can be set by provider or by patient **Application:** Provider can set planned goals for patient for increasing walking and PA gradually over time throughout the pregnancy

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Knudsen et al. (2024). The effect of exercise training and motivational counseling on physical activity behavior and psychosocial factors in pregnant women: secondary analyses of the FitMum randomised controlled trial investigating prenatal physical activity. **Country:** Denmark **Funding:** Independent Research Fund Denmark and University of Copenhagen and Copenhagen University Hospital—North Zealand	Self-Efficacy Theory and Self-Determination Theory	**Design:** secondary analysis of RCT **Purpose:** explore the impact of structured supervised exercise training or motivational counseling of PA on PA levels compared to standard prenatal care	**N =** 219 CG: n= 45 IG1: n= 87 IG2: n= 87 **Demographics:** inactive pregnant women **Setting:** online format and conducted virtually **Exclusion:** unsafe to do PA/contraindications to PA during pregnancy **Attrition:** 0.4%	**IV1:** structured exercise **IV2:** motivational interviewing **DV1:** level of motivation for PA **DV2:** Pregnancy exercise self-efficacy **Definitions:**	**Tools:** Behavioral Regulation in Exercise Questionnaire-2 - reliable and valid in the general population; psychometric properties have not been tested among rehabilitation populations Pregnancy Exercise Self-Efficacy Scale - valid and reliable Short Form 36 Health Survey Questionnaire - show high retest reliability **Validity/Reliability:** reviewed above with each listed tool	**Statistical Tests Used:** linear mixed model linear regression analyses	**DV1:** $p<0.001$ structured exercise or motivational interviewing increased motivation for PA **DV2:** $p= 0.005$ structured exercise had higher self-efficacy than standard care	**Level of Evidence:** Level 2 **Strengths:** enabled comparisons of two groups, multiple dimensions of questionnaires, valid and reliable measurements, low-cost **Weakness:** self-reporting bias, general pregnancy population and not specific to GDM **Feasibility:** It is feasible to use virtually in electronic health records system **Application:** initiating motivational interviewing with a structure or plan for PA is beneficial to increase motivation and self-efficacy and in turn increase PA compared to standardized care

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice; Generalization
Bias: self-reporting data								
Igwesi-Chidobe et al. (2022). Community-based non-pharmacological interventions for pregnant women with gestational diabetes mellitus: A systematic review. **Country:** Nigeria **Funding:** No funding **Bias:** RCT range from low to high risk; all quasi-studies were high risk bias	Intervention review	**Design:** Systematic Review **Purpose:** systematically review community-based non-pharmacological interventions and evaluate their effectiveness for GDM	**N =** 27 studies ***n*=** 6,242 patients **Study characteristics:** RCTs, non-RCTs, retrospective cohorts, prospective cohort, case series, and longitudinal; tested interventions of diet and exercise for GDM women **Search Strategy:** Conducted by Cochrane handbook; PubMed, CINAHL, CENTRAL, Global Index Medicus, etc. from September 2020 to January 2022 **Exclusion:** not reported in English, without primary data or duplicate publications	**IV1:** IG (Community-based or non-pharmacological intervention) compared to the CG **DV1:** BG / glycemic control **DV2:** PA level **DV3:** self-efficacy/self-management **Definitions:**	**Tools:** BG testing/glucometer Self-report **Validity/Reliability:** Valid but not reliable	**Statistical Tests Used:** meta-analysis	**DV1:** better in exercise groups $p < 0.001$; fasting and PP $p= 0.049$ and $p= 0.023$ respectively **DV2:** $p= 0.001$; $p= 0.014$ (more active, increased PA, more steps/walking per week); favorable to IG **DV3:** self-efficacy IG > CG $p= <0.001$; self-management $p< 0.001$	**Level of Evidence:** Level 1 **Strengths:** education was a large portion, variety of interventions **Weakness:** diet and exercise, rather than just exercise, strength of evidence for PA, inclusion of observational studies **Feasibility:** The results are feasible in the clinic setting and with the particular population of pregnant women **Application:** The specific PA interventions

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Table A2
Synthesis Table

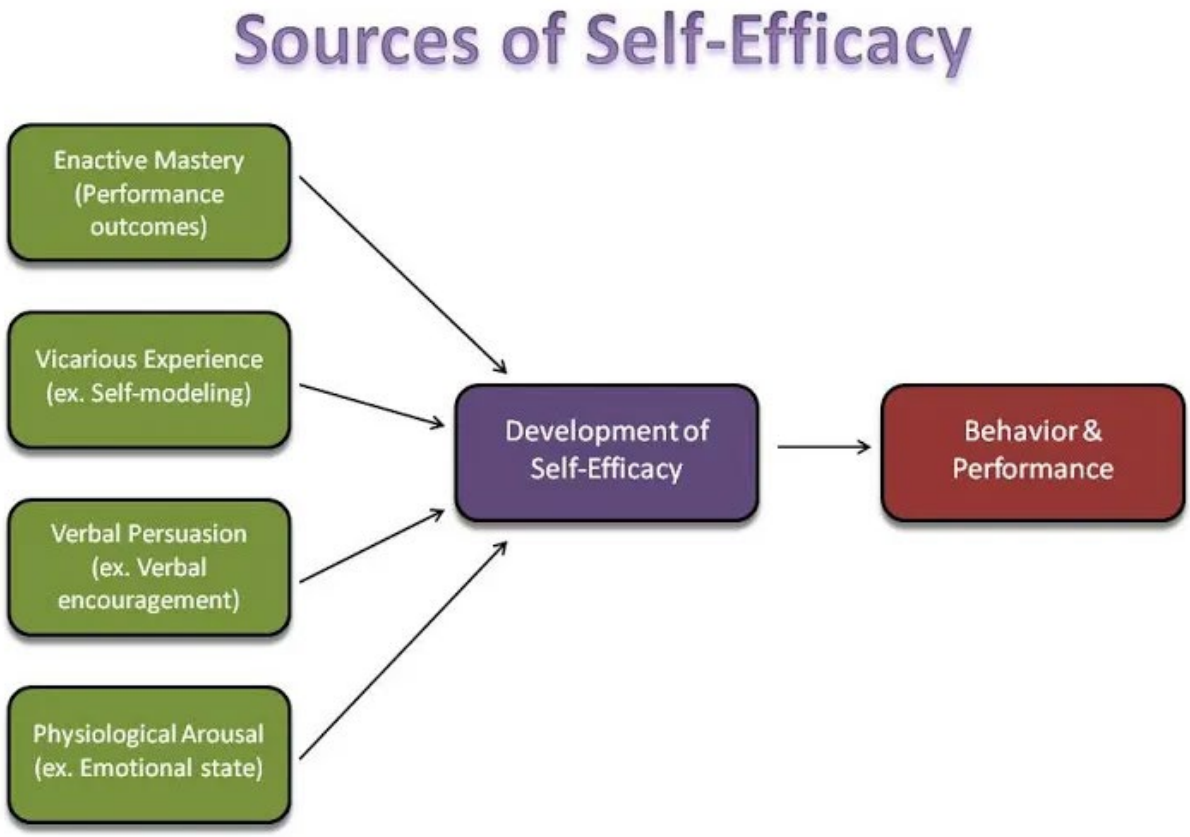
Study (Author, year)	Harrison et al., 2020	Nagpal et al., 2020	Rodriguez-Blangque et al., 2020	Riera-Sampol et al., 2021	Patel et al., 2021	McDonald et al., 2022	Xie et al., 2022	Igwesi-Chidobe et al., 2022	Christie et al., 2024	Knudsen et al., 2024
Design **LOE**	RCT Level 1	RCT Level 1	RCT Level 1	RCT Level 1	RCT Level 1	RCT Level 1	RCT Level 1	SR Level 1	RCT Level 1	SA Level 2
Sample										
n subjects	69	88	140	263	500	213	100	6,242	26	219
Pregnant	X	X	X			X	X	X	X	X
GDM	X					X	X	X	X	
Instrument/Theoretical Framework										
Borg Rating of Perceived Exertion			X			X	X		X	
Self-Efficacy Theory	X	X				X			X	X
Interventions										
Workout Plan/Structure			X	X	X	X	X	X	X	X
Education	X	X			X			X	X	
Motivational Interviewing				X				X		X
Outcomes/ Themes										
PA/Exercise in mins		↑	↑	↑	↑			↑	↑	↑
Fasting BS and PP BS						↓	↓	↓		
Adherence		↑		↑			↑		↑	
Self-Efficacy	↑							↑		↑

BS Blood Sugar **GDM** Gestational Diabetes Mellitus **LOE** Level of Evidence **PA** Physical Activity **PP** Post Prandial **RCT** Randomized Control Trial **SA** Secondary Analysis **SR** Systematic Review

Appendix B

Models and Frameworks

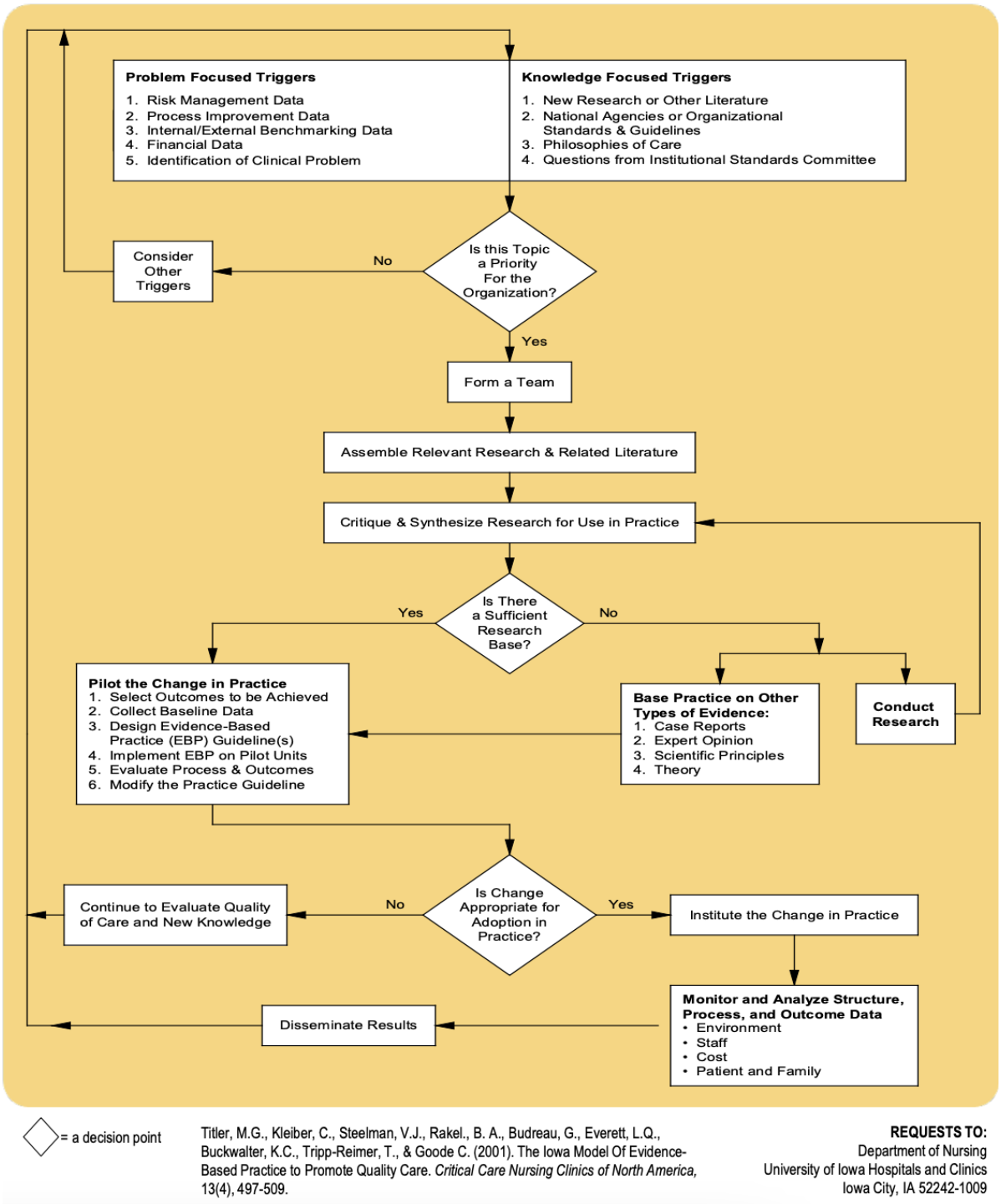
Figure B1
Self-Efficacy Theory



(Bandura, 1997)

Figure B2

The Iowa Model of Evidence-Based Practice to Promote Quality Care

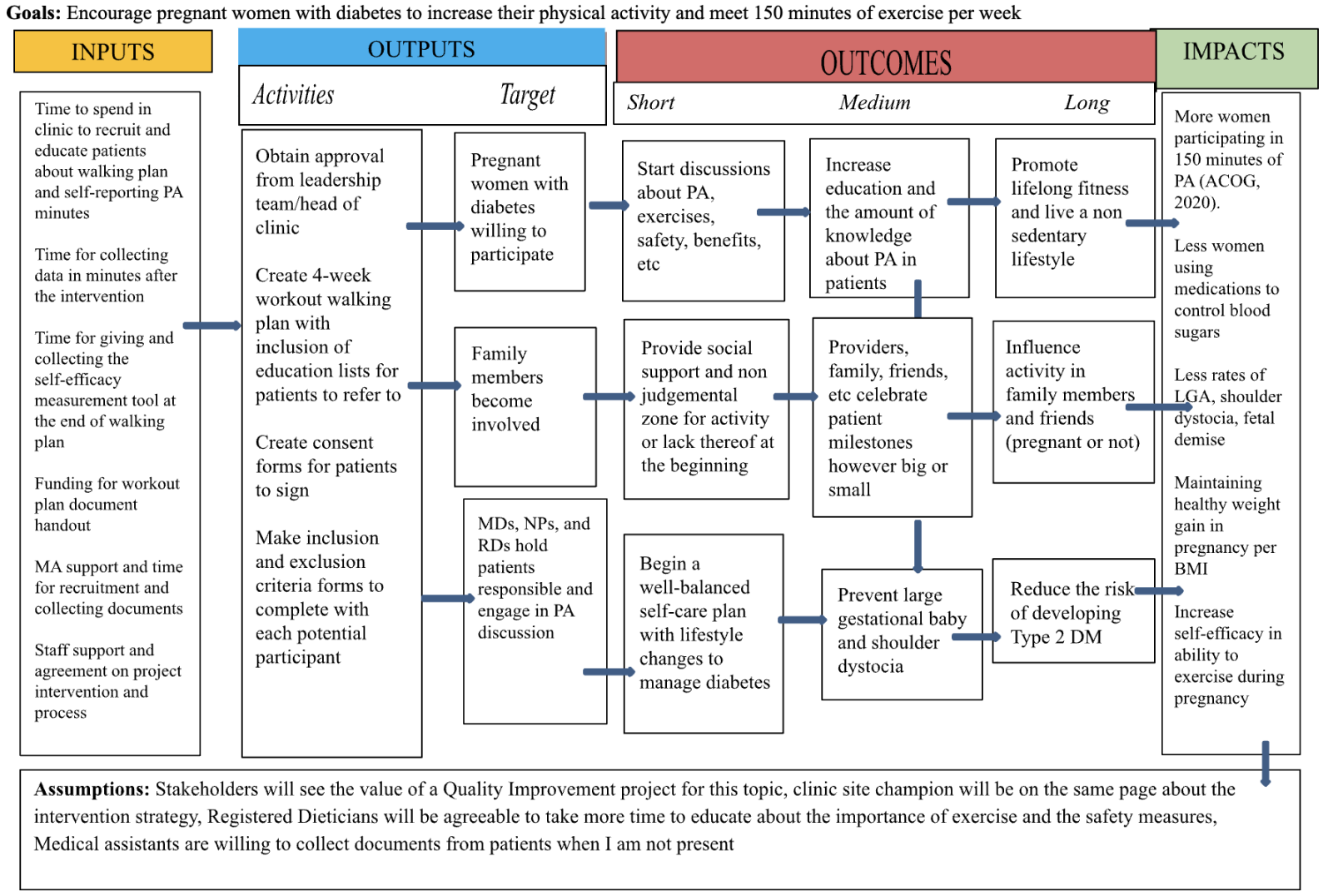


(Titler et al., 2001)

Appendix C

Logic Model

Logic Model



Appendix D

Intervention Documents

Figure D1

Provider Demographics

Subject ID_____ Date_____

"Walking Plan During Pregnancy for Previously Inactive Women"

Provider Demographics

Demographics: We would like to know more about you. Please "FILL IN THE BLANK" or ***CHECK*** the answer that best describes you.

Age _____ (years)

Credentials

____ CNM

____ NP

____ DNP

____ DO

____ MD

____ Other _____

Data Entry _____ Data Validation_____ Data Analysis_____

Figure D2

Pregnancy Walking Log - Demographics

Subject ID_____ Date_____

"Walking Plan During Pregnancy for Previously Inactive Women"

Participant Demographics

Demographics: We would like to know more. Please "FILL IN THE BLANK" or ***CHECK*** the answer that best describes the participant.

Age _____ (years)

Ethnicity or Race

____ White/Caucasian

____ Hispanic/Latino(a)

____ Black/African American

____ Asian

____ Alaskan/Hawaiian

____ American Indian/Native American

____ Other _____ (specify)

Insurance?

____ Private Insurance

____ AHCCCS

____ Uninsured/Self Pay

Please detach the first page of this form and return it to the designated bin to be collected.

Data Entry _____ Data Validation_____ Data Analysis_____

Figure D3
Pregnancy Walking Log - English

Subject ID_____ Date_____

Walking Plan During Pregnancy
For Previously Inactive Women

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total Minutes
Week 1	*15 mins* ___ mins	___ mins	*15 mins* ___ mins	*15 mins* ___ mins	*15 mins* ___ mins	___ mins	*15 mins* ___ mins	_____ **Total Mins**
Week 2	*20 mins* ___ mins	*20 mins* ___ mins	___ mins	*20 mins* ___ mins	*20 mins* ___ mins	*20 mins* ___ mins	___ mins	_____ **Total Mins**
Week 3	*25 mins* ___ mins	___ mins	*25 mins* ___ mins	*25 mins* ___ mins	*25 mins* ___ mins	___ mins	*25 mins* ___ mins	_____ **Total Mins**
Week 4	*30 mins* ___ mins	*30 mins* ___ mins	___ mins	*30 mins* ___ mins	*30 mins* ___ mins	*30 mins* ___ mins	___ mins	_____ **Total Mins**

mins = minutes of moderate-intensity walking
Walk on 5 of the 7 days each week

Moderate-Intensity means you are moving enough to raise your heart rate or sweating but you should always be able to speak in full sentences

Perform the "talk test" while you are walking if you are unsure of your intensity level. The "talk test" means you can hold a conversation but not sing while you are walking

Safety Considerations:

- Stay hydrated
- Wear loose-fitting clothing
- Avoid high heat and humidity
- Avoid long periods of lying down on back

STOP walking exercise and consult your provider if you experience:

- Vaginal bleeding / Bleeding
- Abdominal pain
- Regular and painful contractions
- Water breaks
- Leaking of fluid
- Difficulty breathing before physical activity
- Dizzy or lightheaded
- Headache
- Chest pain
- Muscle weakness
- Pain or swelling in calf

American College of Obstetricians and Gynecologists. (2020). ACOG committee opinion number 804: Physical activity and exercise during pregnancy and the postpartum period. *Obstetrics & Gynecology, 135*(4), e178–e188. https://doi.org/10.1097/AOG.0000000000003772

Data Entry _____ Data Validation_____ Data Analysis_____

Figure D4

Pregnancy Walking Log - Spanish

Subject ID_____ Date_____

Plan de caminata durante el embarazo

Para mujeres inactivas previamenta

	Domingo	Lunes	Martes	Miércoles	Jueves	Viernes	Sábado	Minutos Totales
Semana 1	*15 minutos* ___ minutos	___ minutos	*15 minutos* ___ minutos	*15 minutos* ___ minutos	*15 minutos* ___ minutos	___ minutos	*15 minutos* ___ minutos	_____ **Minutos Totales**
Semana 2	*20 minutos* ___ minutos	*20 minutos* ___ minutos	___ minutos	*20 minutos* ___ minutos	*20 minutos* ___ minutos	*20 minutos* ___ minutos	___ minutos	_____ **Minutos Totales**
Semana 3	*25 minutos* ___ minutos	___ minutos	*25 minutos* ___ minutos	*25 minutos* ___ minutos	*25 minutos* ___ minutos	___ minutos	*25 minutos* ___ minutos	_____ **Minutos Totales**
Semana 4	*30 minutos* ___ minutos	*30 minutos* ___ minutos	___ minutos	*30 minutos* ___ minutos	*30 minutos* ___ minutos	*30 minutos* ___ minutos	___ minutos	_____ **Minutos Totales**

minutos = minutos de caminata de intensidad moderada
Camine 5 de los 7 días de cada semana

Intensidad moderada significa que se está moviendo lo suficiente para aumentar su frecuencia cardiaca o sudar, pero siempre debe de poder hablar diciendo frases completas.

Realice la "Prueba de caminata" mientras está caminando si no está segura de su nivel de intensidad. La "Prueba de caminata" significa que puede mantener una conversación pero no cantar mientras camina.

Consideraciones de seguridad:

- Manténgase hidratada
- Use ropa holgada
- Evite el calor y la humedad altos
- Evite permanecer acostada boca arriba durante períodos prolongados

DETENGA la caminata y consulte a su medico si experimenta:

- Sangrado vaginal/hemorragia
- Dolor abdominal
- Contracciones regulares y dolorosas
- Rotura de la fuente
- Fugas de líquido
- Dificultad para respirar antes de la actividad física
- Mareos o aturdimiento
- Dolor de cabeza
- Dolor en el pecho
- Debilidad muscular
- Dolor o hinchazón en la pantorrilla

American College of Obstetricians and Gynecologists. (2020). Opinión del comité del ACOG número 804: Actividad física y ejercicio durante el embarazo y el posparto. Obstetricia y ginecología, 135(4), e178—e188. https://doi.org/10.1097/AOG.0000000000003772

Data Entry _____ Data Validation_____ Data Analysis_____

Appendix E

Budget

Project Budget

Phase	Activities	Cost	Indirect Costs	Total
Preparation	Print provider demographics (25)	$0.24 per page		**$6**
	Print Pregnancy Walking Log - English (100)	$1.22 per page		**$122**
	Print Pregnancy Walking Log - Spanish (100)	$1.22 per page		**$122**
	Organizer file bin			**$32.57**
	Stapler, staples, pens (for writing participant ID numbers on documents)		Time for writing Subject ID #s on papers and stapling the first and second pages together	**$50.34**
	Educate providers within the Women's Health Clinic and lunch for compensation	Lunch catering cost	30 minutes of designated time for education	**$200**
	Translation services from English to Spanish		Time to submit and communicate with the translator	**$49.98**
	Translation services to verify translation (Spanish back into English)		Time to submit and communicate with the translator	**$29.07**
Delivery	Providers give walking log to patients and educate		More time the patient will spend in the appointment	**$0**
Evaluation	Typing in exercise minutes for each participant		Time to review and type data from each document	**$0**
	Review and analysis of results		Time for analysis	**$0**

Appendix F

Results

Table F1
Frequency Table for Healthcare Providers

Variable	*n*	*%*
Credentials		
NP	3	33.33
PA	1	11.11
DNP	2	22.22
MD	2	22.22
CNM, NP	1	11.11
Missing	0	0.00

Note. Due to rounding errors, percentages may not equal 100%.

Table F2

Descriptive Statistics Table for Age of Healthcare Providers

Variable	*M*	*SD*	*n*	Min	Max
Age	38.44	11.29	9	26.00	53.00

Note. '-' indicates the statistic is undefined due to constant data or an insufficient sample size.

Table F3
Descriptive Statistics Table for Total Walking Time Variable by Subject

Variable	Total Walking in Minutes
Week_1_Walking_Time	
Subject 1	20.00
Subject 2	690.00
Week_2_Walking_Time	
Subject 1	35.00
Subject 2	688.00
Week_3_Walking_Time	
Subject 1	50.00
Subject 2	193.00
Week_4_Walking_Time	
Subject 1	50.00
Subject 2	0.00

Table F4
Bar Graph Representing Total Walking Time Variable by Subject