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**Supporting Pregnant People in Prenatal Physical Activity &
Exercise: Brief In-Service Training Integrating the 6 Rs Framework
to Facilitate Counseling by Healthcare Professionals**

Morgan Frazier

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Doctor of Nursing Project

Supporting Pregnant People in Prenatal Physical Activity & Exercise: Brief In-Service Training
Integrating the 6 Rs Framework to Facilitate Counseling by Healthcare Professionals

Morgan J. D. Frazier, RN

Submitted in partial fulfillment of the requirements for the degree of
Doctor of Nursing Practice

Seattle University, College of Nursing

2023

Jennifer Fricas

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Table of Contents

Acknowledgements	4
Abstract	5
Introduction	6
Project Aim & Purpose	9
Background & Significance	10
Epidemiology of Insufficient Physical Activity in Pregnancy	10
Recommendations for Physical Activity and Exercise During Pregnancy	10
Social Determinants of Physical Inactivity	11
Clinical Determinants of Physical Inactivity	12
Literature Review	12
Provider Knowledge	12
Provider Attitudes and Practices	13
Informational Support	13
Intervention Plan	14
Setting	15
Problem Statement	15
Conceptual Framework	16
COM-B Theoretical Framework	16
Methodology	17
Project Design and Methods	17
Institutional Review Board	17
Participants	18
The 6 Rs Framework	18
Intervention	19
Data Collection and Measurement	20
Results	23
Data Analysis	23
Attitudes	24
Beliefs	25
Patient Beliefs	27
Self-Efficacy	28
Knowledge	31
Qualitative Themes	34
Discussion	36
Limitations	40
Conclusions	41
Implications for Practice	41
Future Plans	42
References	44
Appendix A	53
Appendix B	56

Appendix C	57
Appendix D	73
Appendix E	74
Appendix F	75
Appendix G	77

Acknowledgements

I would like to thank my chair Dr. Fricas for her guidance and patience with my ever-evolving topic. I am appreciative of Tara Lawal and Jodilyn Owen for allowing me to pursue this project when there was already a long list of projects and tasks on their plate. Thank you to the Rainier Valley Birth Center team for their participation; their contributions to nursing science research are valuable.

Thank you to the preceptors and patients I interacted with during clinical rotations that encouraged me to continue to advocate for antenatal exercise as a health promotion approach for expectant parents. When being pregnant can sometimes feel like traversing a minefield of advice, I truly believe proper guidance surrounding antenatal exercise is essential care that needs to be accessible to all pregnant people.

To my mother, thank you for inspiring me to be a strong career woman and mom. Thank you to the village who helped raise my children and gave me peace of mind while I worked. Thank you to my athletic circle of friends for supporting my resolve to provide clear recommendations for antenatal exercise in order to better support the next generation of exercising mothers. Thank you to my children for being patient and understanding during these challenging four years of graduate study. Last but certainly not least, thank you to my husband for humbly supporting me during this massive undertaking, never once asking for recognition for all he does.

Abstract

Studies show that physical inactivity in pregnancy is attributed to pregnant people receiving inadequate and incomplete prenatal physical activity and exercise (PAE) counseling from healthcare professionals (HCPs). There is a gap in the knowledge translation of prenatal PAE guidelines and pregnant people are uncertain how to safely engage in PAE. The purpose of this quality improvement project was to evaluate the effect of an online brief in-service training integrating the 6 Rs Framework on Rainier Valley Birth & Health Center HCPs' (i.e., Certified Nurse-Midwives and Licensed Midwives) attitudes, beliefs, knowledge, and practices pertaining to antenatal PAE. Quantitative data was collected using Likert-scale and multiple-choice questions that were modified with permission from a tool developed and published by Leiferman and colleagues. The primary investigator assessed provider knowledge of physical activity guidelines in pregnancy and the 6 Rs Framework which was used with permission of Donnelly and colleagues. Open-ended questions assessed provider confidence in PAE prescription. All respondents on the postsurvey agreed that it is important to discuss PAE with pregnant patients, and 86 percent felt confident in doing so. Interestingly however, when respondents were asked to provide an example of how to safely prescribe PAE to a pregnant patient using the principles of frequency, intensity, time, and type, only one respondent addressed all components of the question completely. Despite having access to clinical tools and suitable resources and recommendations to facilitate exercise prescription, most HCPs could not cite specific and consistent PAE guidance. It is unclear whether providing clinics with in-service training on antenatal PAE will reduce the prevalence of physical inactivity in pregnancy, but it is likely to be effective in improving the understanding of barriers at both the provider and patient levels which can translate to benefit gains for patients and the community.

Introduction

In 1996 the first-ever U.S. Surgeon General's Report on physical activity and health was released. It was hailed as historic because it was the first federal publication that synthesized a large volume of scientific and medical evidence on the importance of physical activity; it was the first time physical activity was intentionally incorporated into the nation's public health agenda. At the time, the report found that U.S. women were most at risk for being inactive and sedentary; more than 60 percent did not engage in the recommended amount of physical activity and more than 25 percent of women were not active at all (US Department of Health and Human Services [USDHHS], 1996). After the release of the Surgeon General's physical activity guideline, few national-based long-term, cross-sectional studies tracking physical activity were produced.

Twenty-two years later, a follow-up national cross-sectional study was produced by the National Health Interview Survey (2018) which showed that 77.2 percent of women in the U.S. do not meet the relevant aerobic and muscle-strengthening guidelines set forth by the Physical Activity Guidelines for Americans (USDHHS, 2008). Almost a quarter of women reported doing no physical activity or exercise (America's Health Rankings, 2020). It is likely then, based on these national cross-sectional surveys that pregnant people in the U.S. are also at risk of physical inactivity and sedentariness.

Though the literature on physical activity patterns in pregnant people is sparse, particularly on the state level, some large epidemiological studies show there is indeed a higher prevalence of inactivity among pregnant people compared with non-pregnant people of childbearing age. According to a 2015 survey published in the American Journal of Preventive Medicine, 60 percent of U.S. pregnant people reported they do not engage in leisure-time

physical activity such as sports, exercising, and recreational walking (Hesketh & Evenson, 2016). This finding aligns with data reported twenty years prior by Zhang & Savitz (1996).

Physical inactivity is the fourth-leading cause of mortality worldwide. Low levels of physical activity in pregnancy are associated with an increased risk of excessive weight gain, which can cause a host of complications. It is alarming that the prevalence rates of physical inactivity are so high (American College of Obstetrics and Gynecology [ACOG], 2021).

Participation in physical activity during pregnancy, as recommended by various health bodies and organizations, provides many health benefits including reduced cesarean rates, improved glucose control, appropriate weight gain, and reduced risk of pre-eclampsia (Hinman & Quillen, 2015). Other benefits include "increased probability of a normal delivery, reduced length of labor, lowered risk of delivery complications, and reduced risk of low birth weight" (Okafor & Goon, 2021, p. 1). These maternal and fetal benefits highlight the need to give evidence-based physical activity and exercise (PAE) counselling to pregnant people to enhance regular participation and confer greater benefit.

The terms "physical activity" and "exercise" have distinct definitions and yet are used interchangeably in clinical practice. Physical activity is defined as any bodily movement that results in energy expenditure. Exercise is defined as a subset of physical activity that is planned and structured to improve or maintain physical fitness and strength. The variability of these definitions in the literature has clouded research and has contributed to "... multiple inconsistent conclusions as to whether or not physical activity and/or exercise is an effective way to reduce adverse pregnancy outcomes" (Smith & Campbell, 2013, p. 6). Therefore, to eliminate any confusion, the two terms will be used synonymously throughout this paper and project.

Obstetricians and midwives typically audit PAE guidance in pregnancy as it relates to antenatal healthcare. However, whilst obstetricians and midwives are uniquely positioned to provide PAE advice to pregnant people, many seldom do. Previous studies have consistently reported that HCPs do not discuss antenatal physical activity and exercise with up to one third of their patients (Leiferman et al., 2012). Moreover, if providers do engage in regular PAE counselling during prenatal visits, the information disseminated is often unreliable and inaccurate (Hayman, 2017, 2020; Grenier et al., 2021).

Nonetheless, pregnant and postpartum people are inundated with messaging that directs them to consult with healthcare professionals (HCP) to rule out any physical activity restrictions prior to initiating PAE. Pregnant and postpartum people are told that they can safely begin an exercise program only after receiving medical clearance from their HCP. This messaging can be found on exercise equipment purchased at the store, on consent forms prior to participating in prenatal fitness classes, in television advertising, in public health campaigns, and in digital applications. It does not matter if a pregnant or postpartum individual is a new or regular exerciser, this public health messaging has not changed since 1985 when ACOG published the first exercise guidelines for pregnant women (ACOG, 1985). The problem then arises when motivated pregnant people attempt to engage in conversations about PAE with their HCPs only to be met with vague and unclear recommendations.

It is clear there is a disconnect in the translation of the benefits of PAE in pregnancy and current practice guidelines. Interventions that encourage, promote, and increase antenatal HCPs' confidence and knowledge translation of evidence-based PAE recommendations are needed.

Project Aim and Purpose

Thus, the aim of this project is to provide HCPs with a robust framework from which to provide evidence-based exercise recommendations to prenatal patients. Providing an educational opportunity for HCPs to utilize a conceptual framework for PAE counseling that can be used by pregnant patients of all stages and fitness levels may positively impact the frequency and quality of antenatal PAE counseling among providers. An intervention is needed to provide accurate antenatal PAE information to debunk myths about PAE in pregnancy and to highlight the positive benefits of PAE in pregnancy. The purpose of this project is to evaluate the effect of an online brief in-service training integrating the 6 Rs Framework on providers' (i.e., Certified Nurse-Midwives and Licensed Midwives) attitudes, beliefs, knowledge, and practices pertaining to antenatal PAE. The project seeks to determine if a brief in-service training a) bridges the gap between clinical knowledge and current recommendations for antenatal PAE promotion, and b) increases provider confidence in antenatal PAE prescription.

If identifying a patient's risk factors and assessing their level of PAE is part of the process for authorizing "medical clearance" to exercise, and this is within HCPs' scope of practice, then it is also within their scope to provide specific guidance for exercising. A discussion on exercise must address the benefits of being physically active and the application of exercise guidelines, including the frequency, intensity, time, and type of PAE. Thus, a goal of this quality improvement project is to positively change HCPs' language and their discussion around PAE to improve the likelihood of self-efficacy and produce behavioral momentum for pregnant individuals. Moving counseling beyond pre-exercise risk screening and addressing potential harms will reduce sedentary time in pregnant patients, increase physical activity and physical function, and improve health outcomes.

Background and Significance

Epidemiology of Insufficient Physical Activity in Pregnancy

Physical inactivity is defined as “less than 150 minutes of moderate–intensity activity per week, or equivalent” (World Health Organization, 2012, Physical Inactivity). Physical inactivity remains the greatest public health problem of the 21st century and it is associated with a wide array of detrimental effects (Troost et al., 2014). Physical inactivity is an important cause of chronic diseases such as cardiovascular disease, pulmonary disease, diabetes, and cancer. Not only is physical inactivity costly to health, it is costly to the healthcare system. According to the Centers for Disease Control and Prevention, sedentary lifestyle costs taxpayers \$117 billion annually in medical expenses (Centers for Disease Control and Prevention [CDC], 2008).

In pregnancy, physical inactivity is significantly associated with an increased risk of gestational diabetes mellitus, excessive weight gain, hypertensive disorders, and postpartum depression (Syed Nor et al., 2022; Yong et al., 2020). Excessive gestational weight gain is also associated with fetal macrosomia and delivery complications including elevated risk of cesarean delivery (Meander et al., 2021; Xiong et al., 2016). Offspring born to mothers with excessive weight gain are more likely to develop childhood obesity (Badon et al., 2020).

Recommendations for Physical Activity and Exercise During Pregnancy

The prevalence of recommended physical activity among pregnant people in the United States is 15 percent (Evenson et al., 2004; Downs et al., 2012; USDHHS, 2008). Clinical and public health recommendations for PAE during pregnancy are written based on a mix of both evidence and expert consensus; some recommendations are even written based on target audience (Evenson et al., 2014). Governing and professional bodies produce guidelines with the aim to provide recommendations for HCPs so that they may share best practices with their

patients and prescribe PAE, with particular emphasis on PAE frequency, intensity, time, and type (FITT principle). These guidelines also include absolute and relative contraindications, activities to avoid, and signs and symptoms to stop exercise. Rather than summarize the exhaustive differences in guidance across countries, a summary of U.S. guidelines will be presented. These guidelines make antenatal PAE prescription easier for HCPs which can result in increased adherence to physical activity guidelines by both providers and pregnant people.

Based on the latest science, national professional associations and organizations including the ACOG, American College of Sports Medicine (ACSM), and the USDHHS, recommend 30 minutes of moderate-intensity physical activity or more on most, and preferably all, days of the week (ACOG, 2021; ACSM, 2020; HHS, 2008). “Moderate-intensity physical activity is defined as activity with an energy requirement of 3–5 metabolic equivalents (METs)” which is the equivalent of brisk walking, light swimming, cycling to work, or dancing (Artal et al., p. 6, 2003).

Social Determinants of Physical Inactivity

Social context has a profound influence on rates of PAE in pregnancy, as social and structural factors can affect participation in PAE in many ways. Community characteristics such as lack of social support, low community engagement, and perceived benefits and attitudes to PAE are some common reasons for low PAE levels in pregnancy (Harrison et al., 2018). Socioeconomic disparities such as affordability, accessibility, lack of childcare, increased exposure to stressful events, and work hour constraints also play a critical role on knowledge and participation in PAE among pregnant people (Kianfard et al., 2022). It is important to note that systemic and structural racism is a fundamental driver of these disparities, leaving racially and ethnically diverse pregnant people more economically insecure and with far fewer opportunities

for PAE (Davis et al., 2021). Environmental determinants including access to public green and safe spaces and pedestrian environments may limit PAE in pregnancy (Lee et al., 2020). The negative psychological and social impact of the Winter 2022 and 2023 “tridemic” (COVID-19, RSV, and Influenza) exacerbated barriers to antenatal PAE (France-Ratcliffe et al., 2022). Finally, the physical discomforts of pregnancy such as fatigue, nausea, low back pain, and cramping directly influence the ability for pregnant people to engage in PAE (Evenson, Moos et al., 2009; Hegaard, Kjaergaard et al., 2010).

Clinical Determinants of Physical Inactivity

Many interventions have been developed to address the gap between antenatal PAE promotion and compliance. However, antenatal PAE counseling and prescribing are still far from optimal, and this gap may be at least partly due to provider and organizational characteristics. HCPs’ lack of knowledge, skills, and inadequate or insufficient training are the most commonly cited professional barriers to antenatal PAE counseling (Leiferman et al., 2012). Some providers report they do not discuss antenatal PAE because of lack of time and precedence of more important topics. Huijg and colleagues (2015) performed a systematic literature review which revealed lack of support, lack of reimbursement, and lack of resources as sociopolitical and organizational factors affecting HCP PAE promotion practices.

Literature Review

Provider Knowledge

Analyzing literature on prenatal PAE counseling practices of HCPs reveals a lack of expertise and professional knowledge as a major barrier to PAE promotion. Providers are unfamiliar with ACOG prenatal physical activity guidelines (Bauer et al., 2010; Hopkinson et al., 2018; Leiferman et al., 2016; Watson et al., 2015). Incompleteness of prenatal PAE knowledge

implies the possibility of giving misinformation about maternal and fetal risks, heart rate restrictions, activity restrictions for certain groups such as sedentary and obese populations, activity intensity, and activity dose. For example, some HCPs continue to use the outdated recommendation that pregnant exercisers should restrict their heart rate to 140 beats per minute and never exceed more than 15 minutes of exercise at a time. Furthermore, some HCPs go so far as to say pregnant people that were inactive prior to pregnancy should not begin exercise while pregnant. Across the board, information about prenatal PAE that is provided by HCPs is insufficient, contradictory, and conflicting (Okafor & Goon, 2021). Most providers have no training on prenatal PAE counseling and rely on personal experiences (Haakstad et al., 2020; Stotland et al., 2010). A lack of knowledge about safe PAE during pregnancy is a significant practice barrier that dissuades patients from becoming more active.

Provider Attitudes and Practices

Leiferman et al. (2016) assessed whether HCPs' hold "normal, right, or typical" attitudes about PAE in pregnancy. Most providers in the study agreed that it was their responsibility to discuss physical activity and to encourage pregnant patients to engage in physical activity. However, there was a discrepancy between HCP attitudes and practices as few provide individualized exercise prescription (Watson et al., 2015), and most do not obtain exercise histories, nor provide recommendations or hand out pamphlets on moderate-intensity exercise (Albahhar et al., 2021). Again, these findings negatively impact the quality of antenatal PAE counseling among HCPs.

Informational Support

Only 50 percent of people reported receiving some form of exercise guidance and counseling during prenatal care from their obstetric HCP (Evins et al., 2021; Hayman et al.,

2020; Nascimento et al., 2015; Rudin et al., 2021; Whitaker et al., 2016). Low levels of antenatal PAE counseling may be due to the lack of knowledge or incorrect practice among HCPs. This prompts pregnant people to seek informational support from non-healthcare sources such as the internet. While the internet may be an accessible and convenient way to find information related to PAE in pregnancy, it also hosts a large body of inaccurate and unregulated information that is not evidence-based (Cannon et al., 2020; Hayman et al., 2020; Huberty et al. 2013). The same issue holds true for information garnered from technology applications. In fact, only 11 percent of apps designed for pregnancy align with current evidence-based PAE guidelines, and most apps do not screen users for contraindications to PAE during pregnancy (Hayman et al., 2020). Credibility and reliability of the information pregnant people receive regarding PAE influences participation, a challenge that can be greatly improved by receiving accurate advice from HCPs or pregnancy exercise specialists (France-Ratcliffe et al., 2022).

Intervention Plan

Harnessing the credibility and authority of HCPs can lead to improved informational support and can alter HCPs' knowledge and practices pertaining to antenatal PAE. One of the unique aspects of health care delivery during pregnancy is repeated face-to-face clinical visits. In the United States, pregnant people see their prenatal care provider up to fourteen times over the course of an uncomplicated forty-week pregnancy (Shmerling et al., 2022). This gives HCPs with multiple opportunities to counsel about PAE over the course of pregnancy. A low-cost and low-intensity training for HCPs that aims to improve antenatal PAE counseling could lead to better professional development and improve the perception of barriers to PAE counseling in practice. A review of the literature regarding strategies for training HCPs in antenatal PAE counseling includes individual and group training via telephone, video, in-person, brochures, and

online instruction. Of the strategies listed, an online in-service training for HCPs seems to be one of the most feasible intervention strategies with the fewest cost, time, and risk constraints (Santos-Rocha et al., 2022). An online in-service training is also a convenient way to reach a large portion of providers, and if executed correctly, can facilitate clear and consistent antenatal PAE messaging.

Setting

Rainier Valley Birth and Health Center (RVBHC) is located in a “Federally Designated Medically Underserved Area” (Rainier Valley Birth & Health Center, n.d.). This community-based birth center provides pregnancy and reproductive care for Black, Indigenous, and people of color in South Seattle. The birth center serves pregnant and new families in South King County, “a population in Seattle that bears the highest burden of disparities in access and outcomes in their healthcare” (Pacific Hospital Preservation & Development Authority, n.d., para. 1).

Problem Statement

Physical inactivity in pregnancy has been identified as one of the modifiable risk factors for chronic diseases (Flannery et al., 2018). Yet every year, global data shows physical inactivity prevalence continues to increase. Numerous studies show that physical inactivity in pregnancy may be partly attributed to a disproportionate number of pregnant women receiving inadequate and incomplete prenatal PAE counseling from healthcare professionals (Bauer et al., 2010; Hopkinson et al., 2018; Leiferman et al., 2016; Okafor & Goon, 2022; Watson et al., 2015). There is a gap in the knowledge translation of prenatal PAE guidelines into practice and pregnant people are uncertain how to safely engage in PAE. Consequently, pregnant people seek PAE advice from other sources and non-healthcare professionals (Cannon et al., 2020; Hayman et al.,

2020). Often, these sources of information are neither accurate nor credible (France-Ratcliffe et al., 2022). This may have a substantial impact on individual and public health. Given pregnant people rely on and trust HCPs to provide credible PAE information, it is imperative that HCPs have the necessary knowledge to provide evidence-based PAE guidance to promote positive behavioral change among their patients (De Vivo & Mills, 2019).

Conceptual Framework

COM-B Theoretical Framework

The COM-B model is a tool with theoretical underpinnings that was developed by Michie and colleagues (2011) to diagnose barriers to behavior change. There are three key model components that interact with each other to generate behavior change: (C) Capability, (O) Opportunity, and (M) Motivation. Understanding these components and how they interrelate can generate new insights capable of streamlining practice level changes. Capability is divided into two subcategories, psychological (knowledge) or physical (skills). It refers to whether people have the psychological or physical capability needed to produce a target behavior. Opportunity refers to external factors that facilitate or hinder behavior change. Opportunity is divided into social (societal influences such as stigma) or physical (environmental influences such as money and resources) factors. Finally, motivation refers to emotions, beliefs, values, goals, and habits that inspire and direct behavior.

The COM-B model was applied to identify and analyze project barriers and facilitators to improving antenatal PAE counseling among HCPs. For example, it is well known that HCPs have the psychological capability to provide PAE counseling to pregnant people, many have strong cognitive and interpersonal skills, yet many HCPs lack the knowledge and awareness of what to advise or where to refer (De Vivo & Mills, 2019; Leiferman et al., 2016; Okafor &

Goon, 2021). Basic antenatal PAE concepts such as safety, benefits, and guidelines are vaguely addressed or replaced by generic advice. In this project, the COM-B model was employed to achieve education on key PAE messages that are practicable and easily translatable to patients. I The COM-B model helped determine if the intervention addresses key knowledge domains pertaining to antenatal PAE concepts.

Methodology

Project Design and Methods

Institutional Review Board

The project proposal was approved by the DNP faculty mentor. The Institutional Review Board (IRB) application was approved and then signed by both the faculty and clinical site mentor. Per Federal regulation and Seattle University policy, the IRB application was then submitted to the Seattle University IRB and was identified as “Not Human Participant Research” (NHPR).

The implementation phase was initiated in the beginning of March once the site contract with RVBHC was finalized and after the pre- and post- evaluation surveys and in-service training had been tested and accepted by the DNP mentor and principal investigator. Activities in this phase also included notification of project implementation to RVBHC Clinic Director and midwives via Canva flyers, execution of the in-service training video and previously defined data collection methods, data entry or conversion, and post implementation review. The implementation phase continued into April until all participant responses had been collected in the post-evaluation survey. Data analysis and discussion took place April to May, with the final written report completed June 1st.

Participants

A Quality Improvement (QI) project was conducted at RVBHC. The target population for the intervention included RVBHC HCPs, such as Certified Nurse-Midwives (CNMs) and Licensed Midwives (LMs) who provide antenatal care. A Registered Nurse (RN), Lactation Counselor (LC), Pediatric Nurse Practitioner (PNP), and Social Worker (LCSW) were also included in the study as these healthcare professionals frequently counsel pregnant patients and parents about the benefits of PAE during pregnancy. Convenience sampling was used as RVBHC has a small team of healthcare professionals. Thus, due to the project's small sample size, the recruitment and retention of *all* participants was key. The intervention aimed to address PAE counseling behaviors in this target population to impact the health of their patients and community. Family Nurse Practitioners, doulas, and student practitioners were excluded from the project.

The 6 Rs Framework

The 6 Rs Framework was developed by Donnelly and colleagues (2022) to help HCPs and patients anticipate the expected physical, physiological and psychological changes brought about by pregnancy and how to plan and counsel for them. Each phase of the framework – Ready, Review, Restore, Recondition, Return, and Refine – highlights ways in which multidisciplinary providers, including midwives and obstetricians, can support perinatal athlete care. The 6 Rs Framework was developed for perinatal athletes and has not been applied for pregnant people for PAE counseling in general. Whether a pregnant person is a recreational exerciser or a competitive athlete, understanding and applying the elements of this framework can be a driving force for considering wider system factors that influence a person's psychological and physical capability to perform PAE. The Review phase, for example,

addresses musculoskeletal and pelvic health needs of pregnant exercisers. A pregnant person experiencing low back or pelvic girdle pain according to the 6 Rs Framework, are said to exist in the Review phase, and this presents a unique opportunity for HCPs to counsel about pelvic floor and core exercises that can help support and control the pelvis and low back. Individualized discussion of the different phases can help pregnant people attempt to process the many changes of pregnancy, how these changes affect PAE, and what exercises can help cope with these changes. The framework builds on existing return-to-sport models by using a proactive rather than reactive approach to prenatal exercise management. The 6 Rs Framework recommends that HCPs discuss factors such as childbirth related trauma, menstrual health, breast health, energy balance, psychological well-being, fear of movement, and sleep when discussing PAE. The authors of the framework believe that counseling should address whole-systems to better support pregnant patients and activity promotion (Donnelly et al., 2022). When providers consider these factors, they are better equipped to make individualized PAE recommendations.

Intervention

The author recorded an online in-service training video which taught HCPs how to integrate the 6 Rs Framework into PAE counseling and how to provide evidence-based prenatal PAE recommendations to patients. The pre-recorded video targeted critical information in multiple formats. The video used combined methods of a) didactic presentation (objective information given as verbal instruction, i.e., voiceover PowerPoint slides with figures and graphics), and b) practice presentation (HCP counseling a pregnant patient, represented as an AI voice generated avatar, first in an incorrect manner, then in a correct manner).

The contents of the training were focused on eight topics: 1) Barriers to PAE and physiological adaptations during pregnancy; 2) Motivational interviewing; 3) Pre-exercise

assessment and contraindications; 4) Current guidelines for exercise during pregnancy; 5) What's missing from current guidelines; 6) Exercise prescription; 7) Practice presentation demonstrating how to effectively counsel patients; and 8) Reframing "You're Cleared." Five of the eight topic areas of the training were inspired by Santos-Rocha et al. one-day workshop on promotion of physical activity in pregnancy for exercise professionals (2022). Their workshop was adapted from the "EuropeActive's official document on educational standards for the prenatal exercise specialist, and the textbook 'Exercise and Physical Activity during Pregnancy and Postpartum' published by Springer in 2022" (Santos-Rocha et al., 2022, p. 2080). See Appendix A and B for training content and curriculum, Appendix C for presentation slides, and Appendix D for the resource toolkit the author created.

The COM-B theoretical model was used to guide the planning, design, implementation, and adaptation of the in-service training intervention to fit within the evolving needs and priorities of RVBHC and the healthcare system. The in-service training consisted of a pre-recorded online video approximately 55 minutes in length. The in-service training video was available for HCPs to access at a time of their choosing during a two-week intervention period. The in-service training covered topics such as how to address the barriers to PAE during pregnancy, how to review current antenatal PAE guidelines with patients, strategies to promote PAE in pregnancy including using the 6 Rs Framework, and how to medically screen pregnant individuals for contraindications to PAE.

Data Collection and Measurement

The project investigator worked closely with the Executive Director, Clinic Director, and HCPs at RVBHC where the project was approved for implementation. Most healthcare professionals were invited to participate in the project. A project flier (see Appendix E) was sent

to the Clinic Director, who then forwarded the flier to participants via email. The flier was sent out several times in advance of the two-week intervention period to remind participants of the upcoming pre- survey, in-service training, and post-survey. The flier contained a link to an electronic survey distributed through Qualtrics, an online survey tool that contains information about the project and invites voluntary consent on the first page (see Appendix F). Survey data collection begins on page two (see Appendix G) and includes quantitative Likert-scale and multiple-choice questions. The Likert-scale questions were coded using the following system: strongly agree = 5, agree = 4, uncertain = 3, disagree = 2, strongly disagree = 1. Participants completed the same survey questions pre-intervention and post-intervention with the addition of three qualitative open-ended questions on the post-intervention survey. Each participant created their own unique identifier ID through a text entry box in the pre- survey. The post- survey asked participants to identify themselves again using the same unique identifier ID they created in the pre-evaluation survey. The unique identifier ID codes were used to pair pre- and post- responses to evaluate project outcomes. The open-ended questions asked participants to comment on their history of education in the clinical application of PAE, their prescription knowledge, and their perception of the training.

Questions one through ten of the survey are from a tool on assessing provider attitudes, beliefs, and efficacy of counseling on physical activity for pregnant people developed and published by Leiferman and colleagues (2012). Questions 11 through 15 were developed by the primary investigator of this project to assess provider knowledge of physical activity guidelines in pregnancy and the 6 Rs Framework which is used with permission of Donnelly and colleagues (Donnelly et al., 2022). Post-evaluation open-ended questions were developed by the primary investigator of this project to assess provider confidence in PAE prescription and to determine if

a brief in-service training bridges the gap between clinical knowledge and current recommendations for PAE promotion.

No direct identifiers were collected. Indirect identifier information that was collected pertained to provider role and number of years providing healthcare service. This information was necessary to explore potential differences in HCP characteristics (e.g. attitudes, beliefs, knowledge, current practices) and role type and duration. There was a small possibility of exposure to survey errors as it is impossible to force participants to be consistent when inputting their unique identifier ID into the post-evaluation survey. However, this remained the simplest method of ensuring the data from each participant was connected to their pre- and post-responses. All electronic data was stored on a password-protected computer for the online survey software (Qualtrics). The data will be kept for one year, then destroyed. The pre- and post-Qualtrics survey link will be destroyed after data collection and analysis has been completed.

Data were analyzed both through reports available through Qualtrics as well as through exporting data from Qualtrics into Microsoft Excel. Descriptive statistics for multiple-choice items and for Likert scale items were used as appropriate, to explore potential differences on HCP characteristics and attitudes, beliefs, and current practices, as sample size allowed. Increased confidence was measured through the pre/postsurvey questions asking if participants felt confident in effectively talking with all patients about PAE in pregnancy, including overweight and obese pregnant patients. Increased confidence was also measured in healthcare professionals' belief in their capacity to talk about PAE, including PAE guidelines and the benefits and risks of PAE. Furthermore, post-survey open-ended questions were analyzed via a mixed approach of conventional and directed content analysis to produce a thematic description of the data. Themes and salient implications of themes were identified through a process of

thematic analysis involving data familiarization, data coding, identification of themes, revision of themes, defining and naming salient implications of said themes, and writing up. When presenting the results, selected examples of participant quotes (i.e. raw data) are used to illustrate themes. It should be noted that not all participants answered every postsurvey closed ended question.

Results

The final sample comprised of seven RVBHC healthcare professionals currently practicing in family medicine and midwifery. The sample included one CNM, two LMs, one PNP, one RN, one SW, and one LC. A description of the sample by specialty and years providing healthcare service are shown in Table 1. Most participants had been providing healthcare for at least six to nine years (57.1 percent).

Table 1

Sample Description by Specialty and Years Providing Health Care

	Full Sample (N = 7)		CNM (N = 1)		LM (N = 2)		PNP (N = 1)		RN (N = 1)		SW (N = 1)		LC (N = 1)	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
	7	(100%)	1	(14.3%)	2	(28.5%)	1	(14.3%)	1	(14.3%)	1	(14.3%)	1	(14.3%)
Years Providing Healthcare Services														
<5 years	2	(28.6%)			1	(50%)					1	(100%)		
6 - 9 years	4	(57.1%)	1	(100%)			1	(100%)	1	(100%)			1	(100%)
10 - 14 years	1	(14.3%)			1	(50%)								

CNM: certified nurse midwife; LM: licensed midwife; PNP: pediatric nurse practitioner; RN: registered nurse; SW: social workers; LC: lactation counselor

Attitudes

Figures 1 and 2 display the HCPs’ attitudes regarding PAE in pregnancy. There were high levels of agreement with statements about the importance of discussing PAE with pregnant patients, and the importance of encouraging ACOG’s recommendation of at least 30 minutes of PAE each day. After participating in the brief in-service training, the percentage of healthcare professionals who rated themselves as agreeing or strongly agreeing with the importance of discussing PAE with pregnant patients AND encouraging patients to engage in 30 minutes of PAE each day increased from 86 to 100 percent.

Figure 1

Extent of Agreement of Healthcare Professionals to the Prompt: "It Is Important to Discuss PAE with Patients"

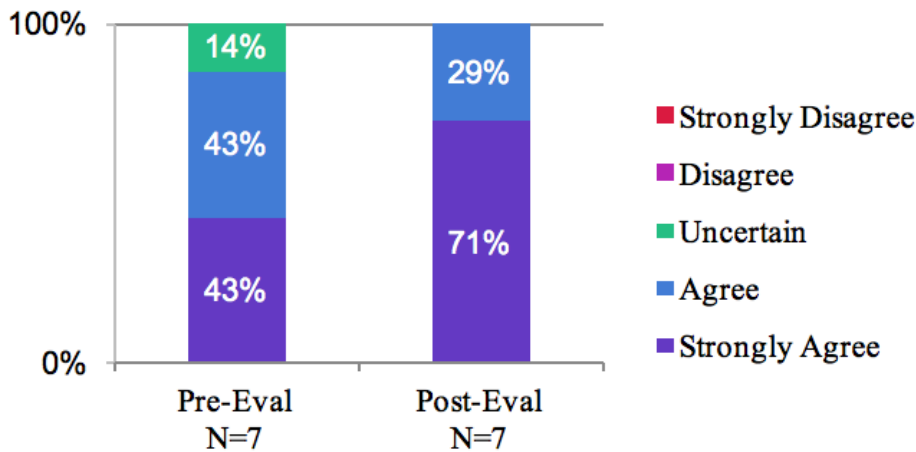
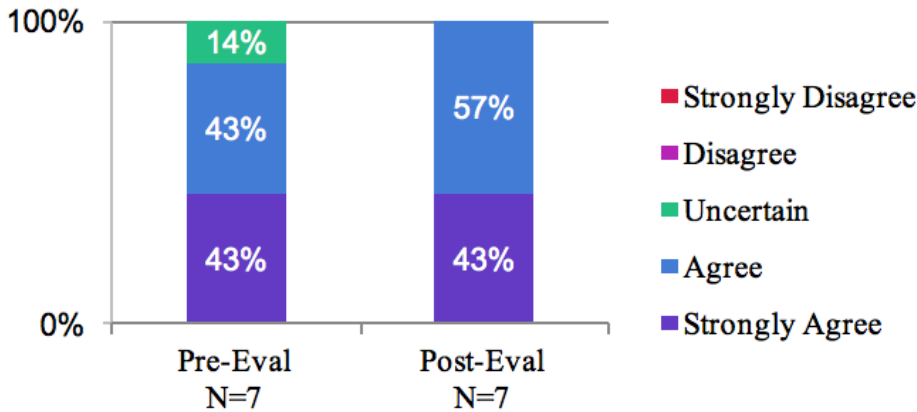


Figure 2

Extent of Agreement of Healthcare Professionals to the Prompt: “It Is Important to Encourage Patients to Engage in 30 minutes of PAE Each Day”

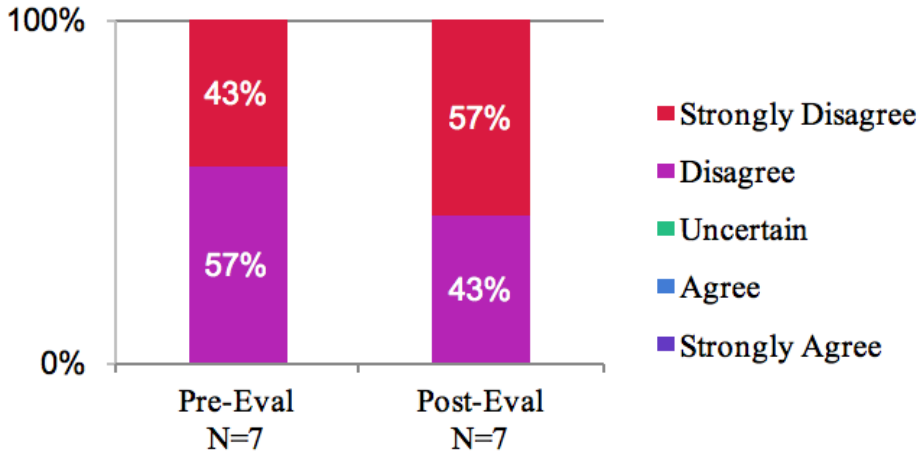


Beliefs

Figures 3 through 5 display the HCPs’ beliefs regarding PAE in pregnancy. There were high levels of disagreement with statements about sedentary, and sedentary overweight patients not beginning PAE during pregnancy and not decreasing their exercise as the pregnancy progresses. Before and after participating in the brief in-service training, zero percent of healthcare professionals believed sedentary, or sedentary and overweight patients should not begin exercise during pregnancy. The percentage of healthcare professionals who rated themselves as disagreeing or strongly disagreeing that pregnant people should decrease their exercise as their pregnancy progresses increased from 57 to 72 percent between the pre and post evaluation surveys.

Figure 3

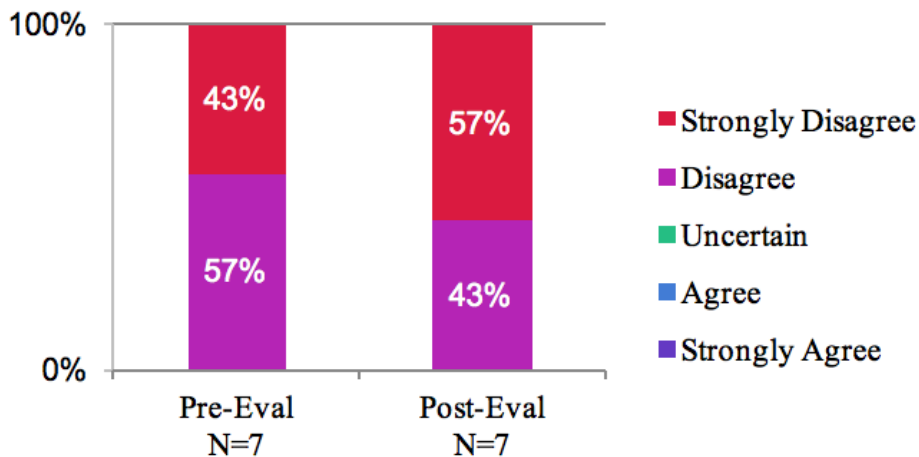
Extent of Agreement of Healthcare Professionals to the Prompt: “Sedentary, Pregnant People Should Not Begin an Exercise Program”



No respondents on the pre- and post-survey selected Strongly Agree, Agree, or Uncertain

Figure 4

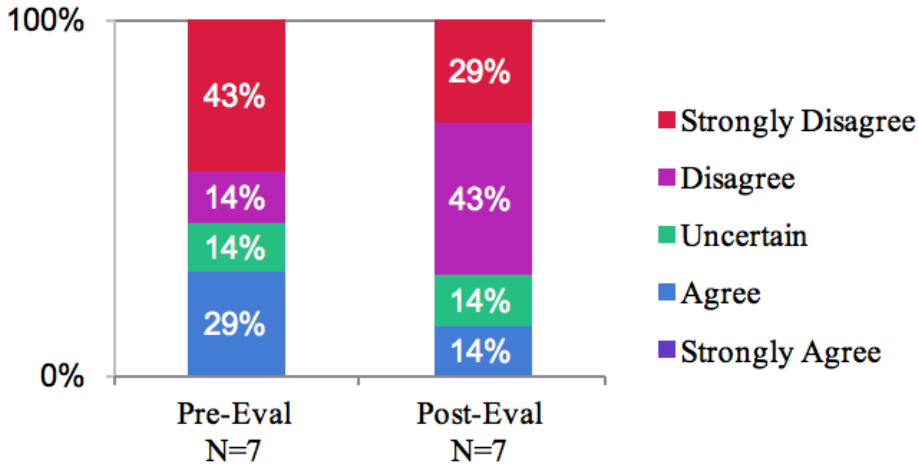
Extent of Agreement of Healthcare Professionals to the Prompt: “Sedentary, Overweight, Pregnant People Should Not Begin an Exercise Program”



No respondents on the pre- and post-survey selected Strongly Agree, Agree, or Uncertain

Figure 5

Extent of Agreement of Healthcare Professionals to the Prompt: "Pregnant People Should Decrease their Exercise as their Pregnancy Progresses"

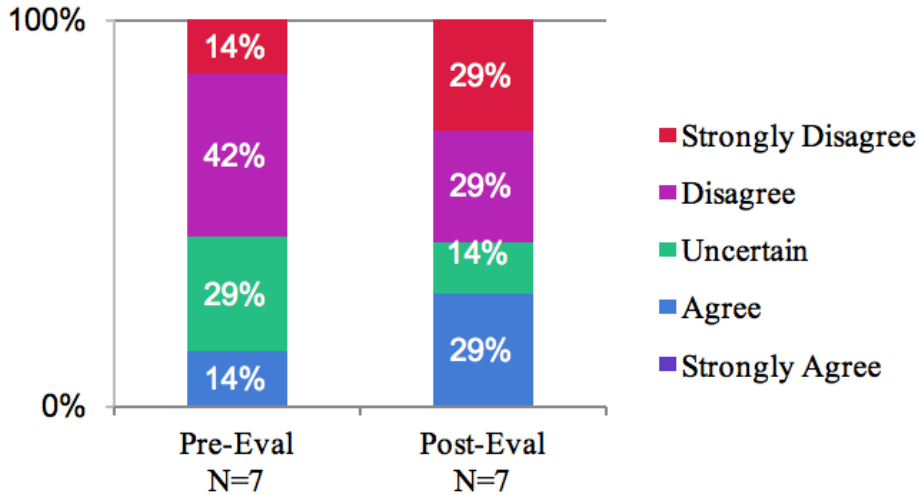


Patient Beliefs

Figure 6 displays HCPs’ beliefs about patient perceptions of PAE discussions. There were high levels of disagreement with the statement about patients being uncomfortable when talking about PAE during pregnancy. Few providers reported that they felt patients were uncomfortable talking about PAE during pregnancy (14 and 29 percent respectively between the pre- and post-evaluation surveys).

Figure 6

Extent of Agreement of Healthcare Professionals to the Prompt: “Patients are Uncomfortable Talking About PAE”



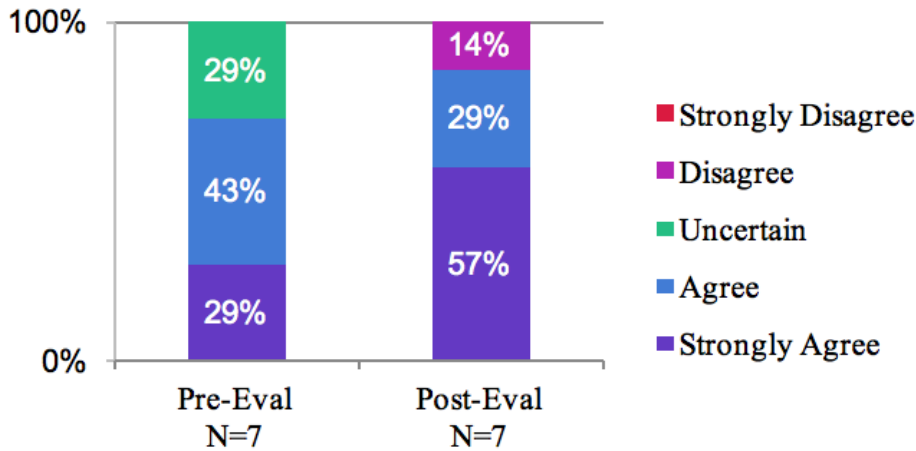
Self-Efficacy

Figures 7 through 10 display provider assessments of their own self-efficacy related to antenatal PAE counseling. There were high levels of agreement with statements about confidence in effectively talking with all patients about PAE in pregnancy, including overweight and obese pregnant patients, after the in-service training program. Confidence in healthcare professionals' belief in their capacity to talk about PAE included a discussion of PAE guidelines and the benefits and risks of PAE. Initially, over 72 percent of participating healthcare professionals felt confident in their knowledge regarding the benefits and risks of PAE and their ability to effectively talk with patients about PAE in pregnancy; this confidence increased to 86 percent after the in-service training. Unfortunately, only 58 percent of healthcare professionals agreed they felt confident that the information on PAE that they distribute to pregnant patients is

consistent with guidelines. However, after the in-service training, this percentage increased to 86 percent.

Figure 7

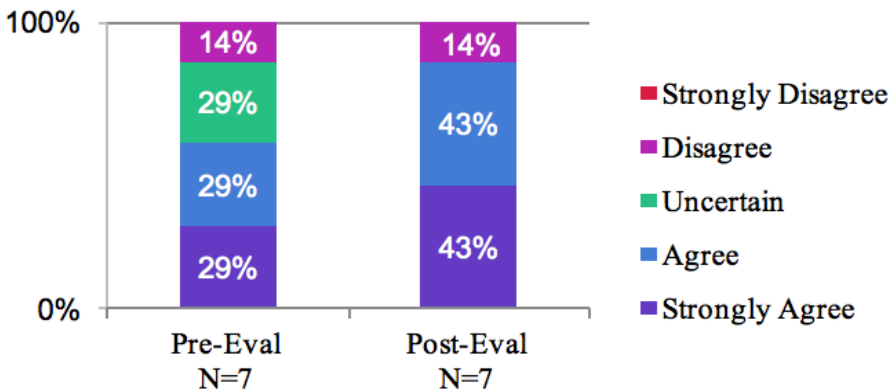
Extent of Agreement of Healthcare Professionals to the Prompt: “I Am Confident in Knowledge Regarding the Benefits and Risks of PAE in Pregnancy”



No respondents on the pre- and post-survey selected Strongly Disagree

Figure 8

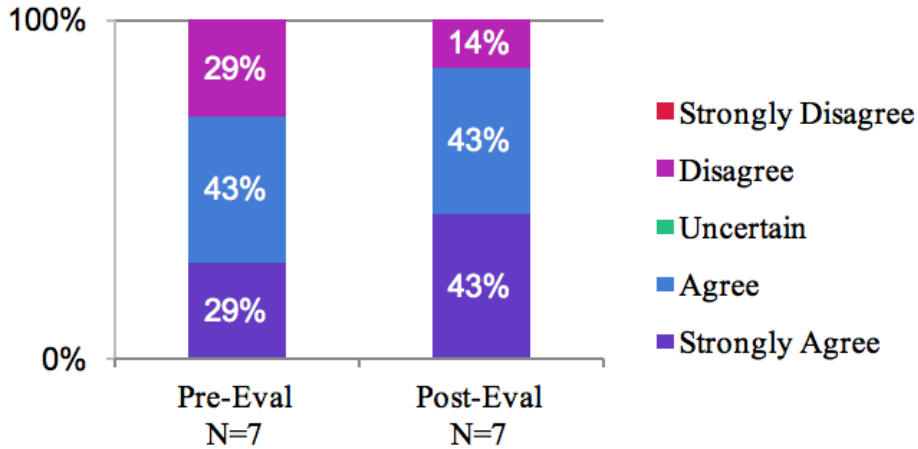
Extent of Agreement of Healthcare Professionals to the Prompt: “I Am Confident that the Information on PAE I Distribute to Pregnant Patients is Consistent with Guidelines”



No respondents on the pre- and post-survey selected Strongly Disagree

Figure 9

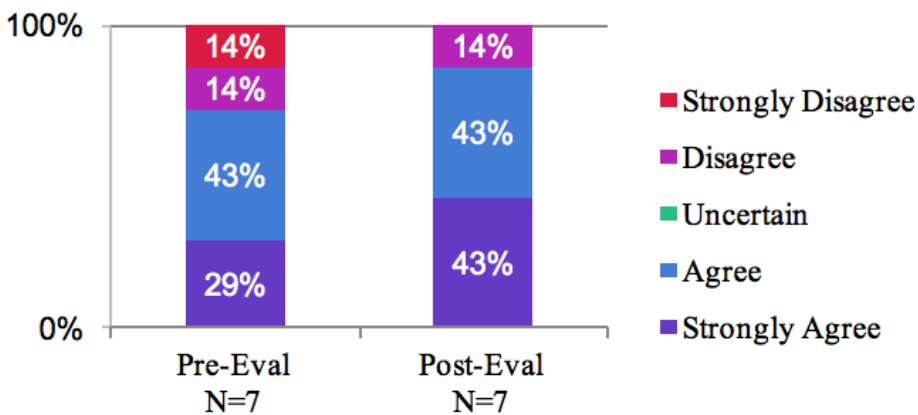
Extent of Agreement of Healthcare Professionals to the Prompt: “I Am Confident in My Ability to Effectively Talk with Patients about PAE in Pregnancy”



No respondents on the pre- and post-survey selected Uncertain or Strongly Disagree

Figure 10

Extent of Agreement of Healthcare Professionals to the Prompt: “I Am Confident in My Ability to Effectively Talk with Overweight and Obese Pregnant Patients About PAE”



No respondents on the pre- and post-survey selected Uncertain

Knowledge

Figures 11 through 15 displays responses for questions one through five which tested HCPs’ knowledge regarding PAE recommendations and contraindications in pregnancy, and the 6 Rs Framework (see Appendix G for a detailed version of these questions and the correct answers that correspond with each question). Each figure presents the response results to each knowledge question by HCP role.

There were no improvements in knowledge between pre- and post-survey scores for questions one and two. There was a 14.4 percent improvement in knowledge between pre- and post-survey scores for question three. Knowledge scores on questions four and five between the pre- and post-survey improved by 28.7 and 42.8 percent, respectively. Finally, the mean score for the seven respondents of the presurvey was 76 percent (SD= 39.5) The mean score for the seven respondents of the postsurvey was 100 percent (SD= 36.3).

Figure 11

Percent of Survey Respondents Answering Correctly the Recommended Minutes of Moderate-Intensity Exercise for Patients Free of Complications, By Role

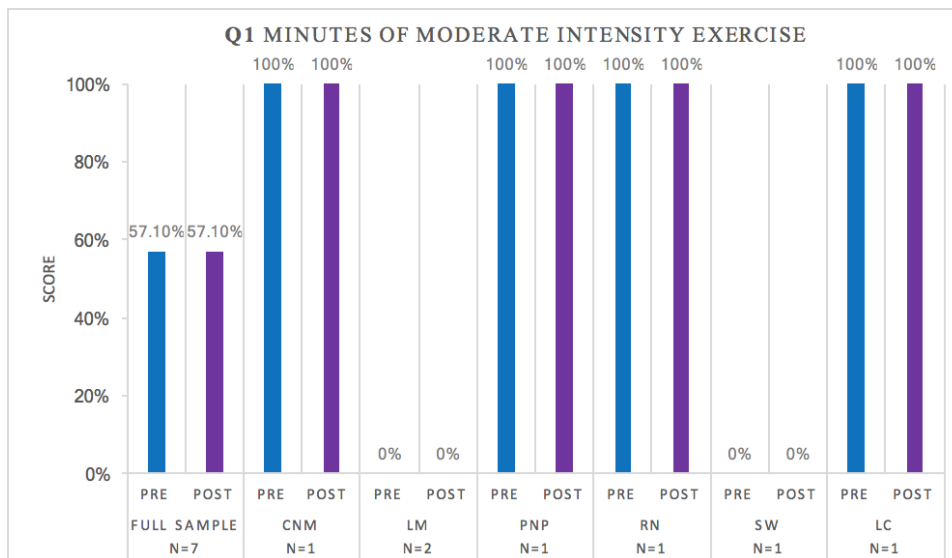


Figure 12

Percent of Survey Respondents Answering Correctly the Patients Who Should Not Be Encouraged to Be Physically Active Throughout Pregnancy, By Role

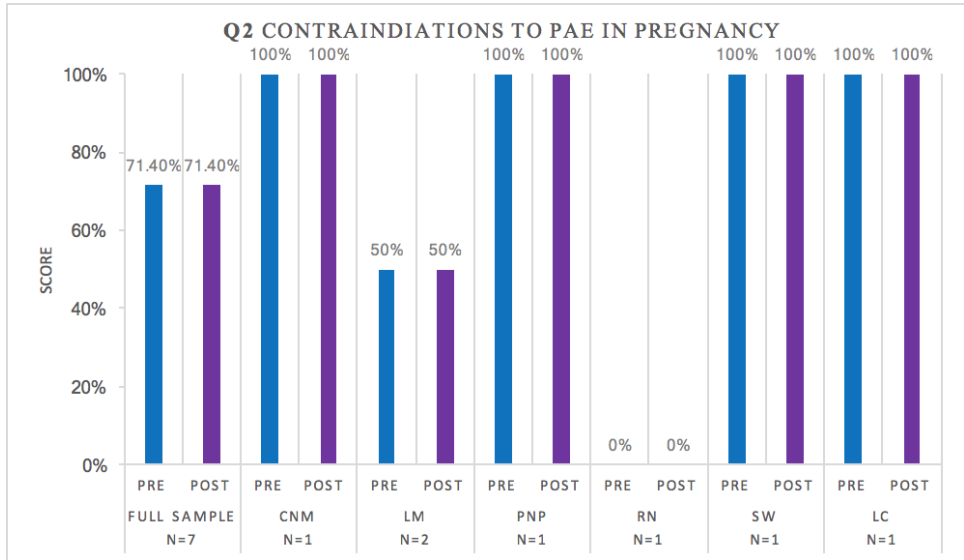


Figure 13

Percent of Survey Respondents Answering Correctly the General Physical Activity Tasks Defined By Moderate Level of Intensity, By Role

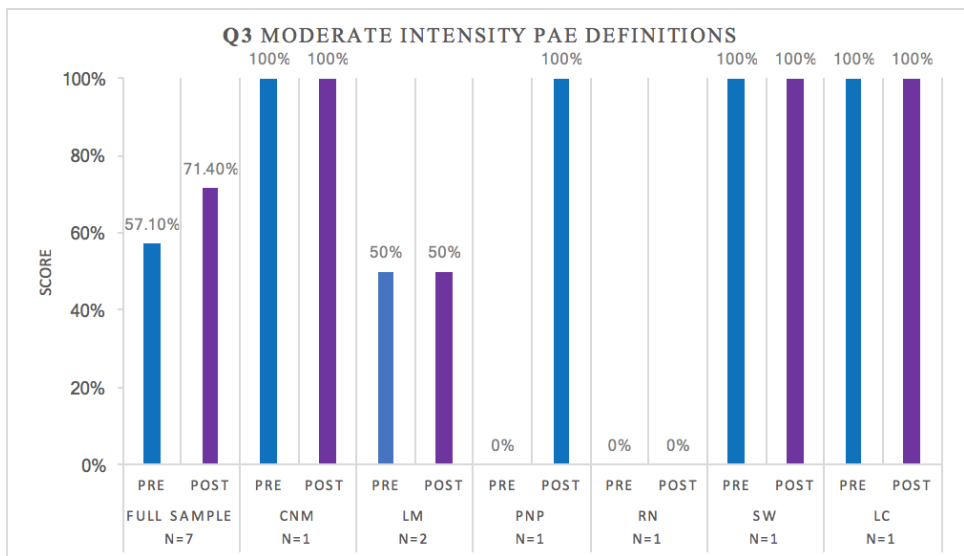


Figure 14

Percent of Survey Respondents Answering Correctly the Factors, According to the 6 Rs Framework, Considered Within a Whole-Systems, Biopsychosocial Approach, By Role

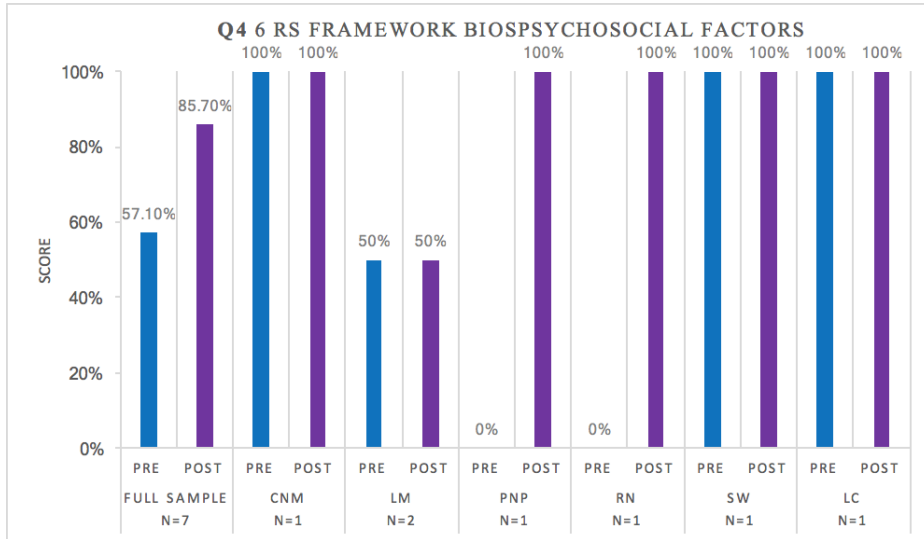
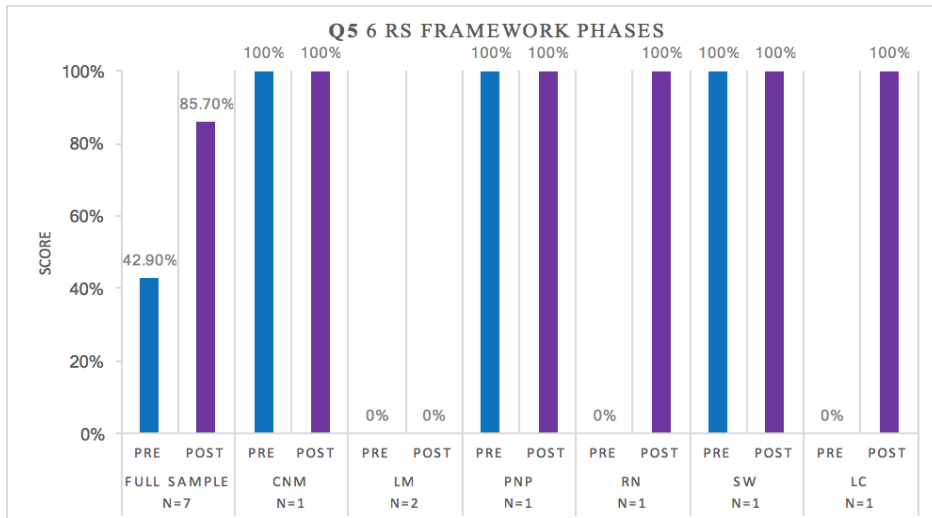


Figure 15

Percent of Survey Respondents Answering Correctly the Phase in the 6 Rs Framework Which Proactively Educates and Supports Patients in Preparation for the Expected Whole-Systems, Biopsychosocial Changes During Pregnancy, By Role



Qualitative Themes

Table 2 displays eight themes produced by three post-survey open-ended questions. The themes presented in Table 2 were developed using both inductive and deductive analysis techniques to gain a comprehensive understanding of the barriers to PAE counseling and prescription. Themes were developed using deductive analysis, and salient implications of themes were driven by inductive analysis of participant quotations which represented the data in a clearer way than deductive themes, and with better differentiation.

It is apparent that HCPs receive limited training and knowledge in advising and counseling pregnant patients about prenatal PAE during antenatal visits. When participants were asked to provide an example of how they could safely prescribe PAE to a pregnant patient using the FITT principle, only one respondent addressed all components of the question completely. Most respondents did not provide specifics on the FITT principles, nor could they describe a prescription that cited consistent PAE guidance. Several respondents expressed that providing an exercise prescription is a burden they do not feel comfortable with or responsible for. In response to the perception of the training, most participants viewed the training favorably, stating that the training helped remind them of the importance of antenatal PAE counseling. Several respondents appreciated the resources and recommendations that were provided during the training.

Table 3

Summary of Qualitative Themes

Describe the training you received as a licensed healthcare professional to advise or counsel pregnant patients about prenatal physical activity and exercise during antenatal visits?

Theme	Salient Implications of Theme	Quotation
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<p>Identified lack of training and knowledge</p>	<ul style="list-style-type: none"> -Reliance on common sense and personal experience to advise and guide pregnant people -Professional opportunities to improve knowledge and confidence -Training or upskilling should be facilitated on study days or as continuing education opportunities -Willingness to improve knowledge 	<p>“None”</p> <p>“Minimal - most of what I have learned is because of self-engaged study”</p> <p>“Mainly on the job training and through counseling patients on an individual needs basis”</p> <p>“State training from the WIC program to provide brief education to low-income patients about prenatal movement”</p> <p>“I took a nutrition class during midwifery school, and we had a PT teach us how to counsel exercise in pregnancy”</p>
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Provide an example of how you could safely prescribe physical activity and exercise to a pregnant patient using the FITT principle (frequency, intensity, time, and type)

Theme	Salient Implications of Theme	Quotation
<p>The burden of responsibility</p>	<ul style="list-style-type: none"> -Extended scope of practice -Passing the buck between exercise and health professionals -Need for interprofessional collaboration -When to refer -Scope and comfort 	<p>“I'm not sure if I'm qualified to provide medical advice in this setting. I would encourage clients that I see to speak with their midwife...”</p> <p>“I still would not feel comfortable doing this”</p>
<p>Lack of specific and consistent PAE guidance</p>	<ul style="list-style-type: none"> -A reliance on general as opposed to professional knowledge and resources 	<p>“Do some activity that causes you to sweat for at least 30 minutes every day.”</p>
<p>Importance of patient shared decision making and collaboration</p>	<ul style="list-style-type: none"> -Patient perception of the importance of PAE during pregnancy -Meeting the specific needs of pregnant people -Promoting specific activities 	<p>“I would collaborate with my patient, ask them how frequent they can commit to a week”</p>
<p>Ambiguous recommendations</p>	<ul style="list-style-type: none"> -Health professionals’ reluctance to recommend exercise can be avoided by providing clear recommendations 	<p>“F = aim for daily physical activity, but at least 3 – 5 times/week</p> <p>I = depends on the activity, but generally if we’re looking at anything other than HIIT, then an intensity that makes it difficult to hold a conversation</p> <p>T = at least 30 minutes unless HITT, in which case only about 10</p>

		Type = whatever brings you joy, but try to balance strength training (~ 3 times/week) with cardiovascular exercise”
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Was the training material and content helpful to you? Why or why not?

Theme	Salient Implications of Theme	Quotation
Lack of emphasis on antenatal exercise in clinic	-PAE advice and encouragement is not routinely provided -PAE guidance is not explored or revisited after the initial consultation visit unless it is brought up by the pregnant person themselves	“Yes. It’s a reminder.” “Yes, it’s a great reminder to have in-depth conversations about this.”
Supporting the mission	-Emphasis that is put on PAE varies depending on healthcare professionals’ area of interest or specialty	“It was interesting! I’m not sure how much I can use it within my scope, but I am happy to be a voice that supports this mission.”
Awareness of suitable resources and recommendations	-Communicating effectively through simple, reliable resources -Desire for reliable and current information as part of evidence-based practice	“I really appreciate all of the references!” “I would use the Rx for exercise on the EIM website.” “The content was helpful.”

Discussion

Physical inactivity remains the greatest public health problem of the 21st century and during pregnancy is associated with a host of complications related to excessive weight gain (ACOG, 2021, Trost et al., 2014). Reducing the prevalence of modifiable risk factors, such as physical inactivity, should be prioritized to reduce the health and economic burden of non-communicable disease and the current mental health crisis (Costa Santos et al., 2023). Evidence suggests that providing PAE counseling education sessions helps reduce this burden (O’Brien et al., 2016). Consistent with previous research, findings from the present project confirm that HCPs (CNMs, LMs, RNs, etc.) are not exposed to sufficient content of PAE in their formal curricula. Only one participant out of the seven stated that a movement expert (Physical

Therapist) lectured about antenatal PAE during midwifery coursework. The purpose of this project was to address this gap by examining the effect of an online, brief in-service training on HCPs' attitudes, beliefs, knowledge, and practices pertaining to antenatal physical activity and exercise.

All (100 percent) respondents on the postsurvey agreed that it is important to discuss PAE with pregnant patients, and 86 percent felt confident in doing so. Moreover, 86 percent of HCPs agreed that they felt confident in their knowledge regarding the benefits and risks of PAE and in their ability to distribute information to pregnant patients consistent with guidelines. Interestingly however, when respondents were asked to provide an example of how to safely prescribe physical activity and exercise to a pregnant patient using the FITT principle (frequency, intensity, time, and type), only one respondent addressed all components of the question completely. This finding goes to show that although mean knowledge scores regarding exercise prescription between the pre- and post-survey increased overall across the five knowledge-based questions, HCPs still may not be able to apply this knowledge in complex contexts because they haven't practiced the skills of integration and synthesis (Kelley & Knowles, 2016).

This finding illuminates one of the limitations of this project, which is that it lacked multiple techniques of learning to allow participants to process and apply information. The in-service training utilized blended learning methodology, including didactic techniques and case-based learning using an AI voice generated avatar, however a simulation-based training technique may have been more appropriate for simulating clinical practice counseling behaviors, and thus improving application of knowledge. In nursing and midwifery education, there are three main teaching domains that students go through as part of their training – the Classroom,

the Skills and Simulation Lab, and the Clinical Setting. Skills and Simulation Lab offers face-to-face learning to help students hone skills and knowledge; simulation-based learning has been critical to improving healthcare quality, especially as clinical experiences have become increasingly limited and harder to access. The trial-and-error approach used in simulation-based training gives students the opportunity to test out different scenarios to see what works and to understand how they arrived at the right and wrong answers, before applying their new skills in the real world. However, cost, scope, and time constraints make scaling simulation learning difficult. Unequal cohort sizes also constrain its scalability. With the evolution of artificial intelligence (AI), an AI avatar can be integrated into simulations to improve contextualizing skills and knowledge in complex situations (Liaw et al., 2023); AI avatars were used for case-based learning in this project for practical feasibility. More research is needed to determine if a blended AI-based simulation learning environment could improve PAE prescribing optimization and care integration.

Despite having access to clinical tools and suitable resources and recommendations to facilitate exercise prescription (as provided during the training), again, most HCPs could not cite specific and consistent PAE guidance. As expected, the results indicate that by training HCPs on the specific guidelines for antenatal exercise prescription and how to individualize prescription, confidence increased. However, what was not expected was the lack of accuracy and reproducibility of participants' exercise prescription.

This finding begs the question: Why can HCPs demonstrate content proficiency through multiple-choice knowledge questions, but have difficulty applying the same knowledge in a hypothetical situation that imposes added demands (e.g., integrating ideas from different resources and recommendations)? One reason may be a disconnect between translating the

knowledge of the importance of antenatal PAE and current recommendations into clinical practice. There are a few potential reasons for this disconnect. First, the number of years providing healthcare service may influence exposure to recent PAE guidelines and recommendations. Over fifty seven percent of HCPs have provided healthcare services for six to nine years and may not have had the opportunity to engage in continuing education training related to this area.

Second, again, nursing and midwifery academic curricula usually lack sufficient lifestyle content (including PAE guidance) to provide HCPs with the knowledge and skills to effectively assess and support healthy lifestyle behavior in pregnant people. Consequently, these HCPs may not recognize their role in healthy lifestyle promotion specific to healthy PAE in practice. They also miss an opportunity to practice lifestyle counseling in an educational setting, which provides a unique opportunity to implement feedback-informed treatment in a safe learning environment using standardized patients, SIMS, etc.

Third, although knowledge of evidence-based exercise prescription guidelines is considered a responsibility of professional practice, applying these guidelines is not seen as standard practice. That is, the application of prescribed exercise as a means of intervention for non-communicable diseases has not been fully realized and appreciated on a mass scale (Milat et al., 2011).

This may be due to ambiguity around the role of antenatal HCPs and their responsibility for providing PAE prescription, a task that is commonly given to that of exercise professionals and interprofessional colleagues. These allied health professionals are more likely to be tasked with achieving PAE promotion objectives as this is more clearly defined to be within their scope. It is unfortunate that there seems to be a blurring of boundaries and responsibilities when it

comes to who should provide antenatal PAE guidance, especially since antenatal visits provide ease of access and more opportunities for reaching pregnant people. It's interesting to note that RVBHC requested that the training be expanded to include providers beyond their midwives, which seems to indicate that multiple providers from different specialties and roles find the promotion of PAE to be important. This request also seems to indicate the added benefit of having patients receive this message from different collaborating providers. However, again, this also blurs the responsibilities for who is the primary educator and prescriber of PAE and what roles others can play. Future research is warranted to determine whether it would be more beneficial for pregnant people to receive clear PAE guidance and support from exercise professionals or from continued engagement with their antenatal HCPs.

Finally, although 86 percent of HCPs reported they agree they are confident in their ability to effectively talk with overweight and obese pregnant patients about PAE, 43 percent of HCPs agree patients are uncomfortable talking about PAE with them. This is in line with previous research that found when HCPs perceive patients are reluctant to communicate health behaviors, HCPs tend to avoid responsibility for addressing this issue; this could be extended to include HCPs absolving themselves from providing exercise prescription (De Vivo & Mills, 2019).

Limitations

A main limitation of the analysis of this quality improvement project was the small sample size which made it difficult to determine statistical significance. In addition, the validity of this project may have been undermined by selection bias; the selection of participants was not random. In the future a more rigorous validation of the surveys is recommended with a larger number of participants in each practice group to enable further comparisons.

For future quality improvement projects, a barrier analysis should be conducted prior to project start-up to determine HCPs' behavioral determinants of PAE counseling. In the post-survey, participants were asked if they found the training content helpful, however a question should also be included to ask participants what further information they would have liked. There should also be an open comment section so that participants have the opportunity to share other thoughts and opinions. Finally, future research should explore the risk versus benefit of keeping some part of the training content optional for viewing. For context, to make the training content more accessible, given the high stakes of getting 100% participation with a small sample size, participants were instructed to review the required content, but were also given a choice to review the optional mini lecture modules.

The mini lecture modules at the end of the training provided an in-depth review of Barriers to PAE and Physiological Adaptations to Pregnancy, Motivational Interviewing, PAE Guidelines (Background), and Clinical Scenarios. Viewing this content was purposefully made optional to ensure the in-service training allowed participants to oversee their learning and to address the desire for improving PAE counseling. However, it is unclear whether the benefits of making elements of this training optional outweighed the potential risks.

Conclusions

Implications for Practice

HCPs that are trained to effectively counsel on prenatal PAE have the opportunity to create a more just and humane world by creating safe spaces for pregnant patients to develop positive attitudes toward PAE without feeling marginalized by HCPs. This positive attitude cycles into the system of having healthy physical activity habits outside of pregnancy which then has a direct impact on personal and family health habits throughout life and positively influences

population health. Antenatal HCPs have the opportunity to be active facilitators of PAE messaging and in turn, facilitators of health promotion and disease prevention.

Access to evidence-based prenatal PAE guidance can improve pregnancy outcomes as well as patient experience. Medical education programs offer passive education or lack emphasis on antenatal PAE. The in-service training program piloted in this project increased HCP knowledge of antenatal PAE. The participants showed increased confidence in specific aspects of antenatal PAE counseling. Most HCPs noted improved attitudes and beliefs after the training. This training should be included in new hire orientation for antenatal providers to reduce health disparities for vulnerable pregnant people.

Future Plans

A written analysis and discussion of the data will be distributed to RVBHC's leadership along with all the participants. It is unclear whether this project will significantly reduce the prevalence of physical inactivity in pregnancy, but it is likely to be effective in improving the understanding of barriers at both the provider and patient levels which can translate to benefit gains for RVBHC patients and the community. The author plans to advocate for the incorporation of more antenatal PAE content into midwifery and nursing education. The author intends to do this by creating online antenatal PAE content available through continuing education courses for advanced practice registered nurses, this will create more opportunities to promote PAE in professional practice. Finally, not all pregnant people will be best served by national PAE guidelines, as these guidelines vary between countries and the information presented is often conflicting and contradictory. Individuals and healthcare professionals should not be burdened with trying to make decisions about teaching or following these recommendations. The author aims to alleviate this burden by also emphasizing to pregnant

patients the importance of examining personal factors such as circumstances, preferences, values, and resources (biopsychosocial factors presented in the 6 Rs framework), when reviewing guidelines and considering different physical activities.

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Appendix A

Online In-Service Training Content

Barriers to PAE and Physiological Adaptations During Pregnancy

The main points are to discuss the barriers and facilitators to PAE, and the physiologic changes in pregnancy that are most relevant to patients who are starting exercise or keeping adherence to exercise. Barriers to PAE in this population includes a discussion about social (lack of social support, low community engagement, and perceived benefits and attitudes to PAE) and structural (systemic and structural racism) factors that can affect participation in PAE, as well as environmental determinants (access to public green and safe spaces and pedestrian environments) that may limit PAE in pregnancy. The prevalence of physical discomforts in pregnancy (e.g., fatigue, nausea, low back pain, and cramping) and whether or how to adjust PAE during pregnancy are also highlighted. Cardiorespiratory, metabolic, and musculoskeletal physiologic changes, as well as genetic predisposition to diastasis recti are reviewed.

Motivational Interviewing

The main points are to describe Motivational interviewing (MI) techniques so that they can be employed by HCPs to support people in exercising during pregnancy. The MI toolbox for HCPs includes four core skills (open-ended questions, affirmations, reflections, and summarizations) that help patients increase both their desire to change exercising habits and their belief that they can in fact change. MI is an evidence-based way of starting conversations with patients about their own motivation and commitment to change. The objective of MI is to explain to patients the benefits of exercise while also exploring their concerns and reasons for change in an accepting and compassionate manner.

PAE Contraindications and Guidelines

The main points are to describe the absolute and relative contraindications for exercising during pregnancy as listed in the Society of Obstetricians and Gynecologists of Canada (SOGC) and the Canadian Society for Exercise Physiology (CSEP) physical activity guidelines (Mottola et al., 2018). The goal of the SOGC/CSEP 2019 Canadian Guideline for Physical Activity Throughout Pregnancy is to provide evidence-based recommendations regarding physical activity during pregnancy in the promotion of maternal, fetal and neonatal health. The relationship between prenatal exercise and gestational diabetes mellitus, gestational hypertension, preeclampsia, depression, and macrosomia is explored.

What's Missing?

The main points briefly highlight what's missing from the SOGC/CSEP 2019 Canadian Guideline for Physical Activity Throughout Pregnancy: the effects and safety of vigorous intensity exercise, including High Intensity Interval Training (HIIT), Cross-Fit, and elite endurance sports; specific heart rate and weight lifting limits while exercising during pregnancy, or the nonnecessity thereof in the context of consideration of the three P's: 1) Pain (lumbopelvic), 2) Pressure (vaginal prolapse), and 3) Passage (passage of urine, stool, or gas).

Prescribing Exercise

The main points are to prepare HCPs for implementing safe and effective exercise prescription based on a patient's health status, baseline fitness, goals, and preferences. The goal of exercise prescription is to provide the dosage of exercise as a function of the frequency (F), intensity (I), time (T), and type (T) of the exercise performed. The Exercise is Medicine (EIM) Physical Activity Vital Sign (PAVS) form and Prescription form provides HCPs' with a simple and effective tool for integrating PAE in prenatal care (Exercise is Medicine Health Care Provider Action Guide, 2007). Both forms explain how to quickly assess PAE levels, provide

exercise prescriptions, and refer patients to certified exercise professionals when appropriate.

The CSEP Health Care Provider Consultation form for prenatal physical activity allows HCPs to recommend unrestricted physical activity or exercise avoidance (CSEP, 2019). There is also a section for HCPs to explain and justify exercise inclusionary and exclusionary criteria in the comments section of this form.

Practice Presentation

The main points are to provide two counseling case studies which demonstrate a HCP counseling a pregnant patient, represented as an AI voice generated avatar, first in an incorrect manner, then in a correct manner. The case study contains an analysis of the patient's health status, baseline fitness, goals, and preferences, utilizing MI counseling techniques, PAE guidelines, the 6 Rs framework, and EIM and CSEP prescription resources. A reflection on why certain strategies were chosen over another in the case studies are provided.

Reframing "You're Cleared"

The main points are to address HCPs requiring patients to obtain "medical clearance" prior to participating in PAE. Healthy pregnant individuals without contraindications do not need formal "medical clearance". Pre-exercise screening is welcomed only when it is used to tailor individualized exercise prescription and to set specific patient goals. HCPs are encouraged to weigh in on how to reframe the negative narrative around PAE and turn it into something that brings joy to patients.

Appendix B

In-Service Training Curriculum

00:00- 55:29 Required viewing - key training content materials

>55:29 Optional mini lecture modules that provide an in-depth review of the following:

55:29 - 1:04:26 Barriers to PAE and Physiological Adaptations to Pregnancy

1:04:26 - 1:09:26 Motivational Interviewing


1:09:27 - 1:15:11 PAE Guidelines - Background

1:15:11 - 1:21:06 Clinical Scenario - Incorrect Counseling Techniques Using an AI Patient

1:21:07 - 1:34:05 Clinical Scenario - Correct Counseling Techniques Using an AI Patient

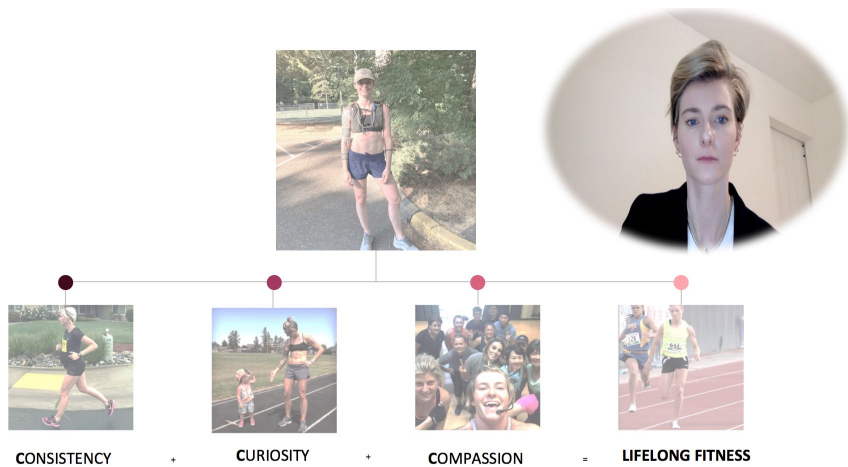

Appendix C

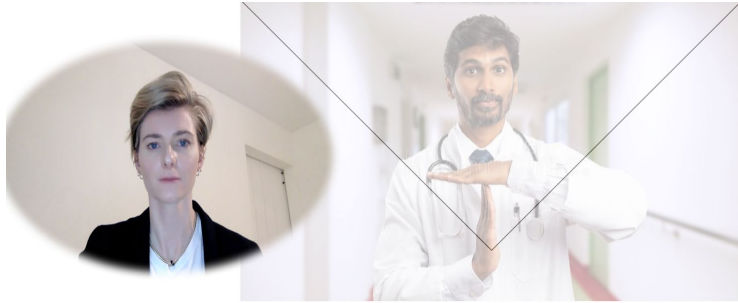
In-Service Training Slide Deck



**Supporting Pregnant People in Prenatal
Physical Activity & Exercise:
Brief In-Service Training**
**Integrating the 6 Rs Framework to Facilitate
Counseling by Healthcare Providers**

*Mo Frazier BSN, RN, CNM Student
Seattle University College of Nursing*





You can start exercise once your doctor or midwife clears you for exercise

You can safely begin an exercise program during pregnancy after consulting with your health care provider

Talk to your health care provider to determine if you have any physical activity restrictions

If you're not sure whether a particular activity is safe during pregnancy, check with your health care provider





4th

Leading Cause of Mortality Worldwide

Physical inactivity is the 4th leading cause of mortality worldwide and in pregnancy is associated with a host of complications related to excessive weight gain.

Why is This Topic Important?

- Motivate
- Educate
- Empower

15%

Pregnant Women Meet National Guidelines

15% of pregnant women meet the minimum national recommendations of 150 minutes of moderate-intensity PA per week.

50%

Of Women Receive Prenatal Exercise Guidance

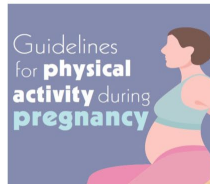
Whilst obstetricians and midwives are uniquely positioned to provide physical activity and exercise advice to pregnant women, only 50% of women receive exercise guidance during prenatal care and 15% are told to stop exercising.

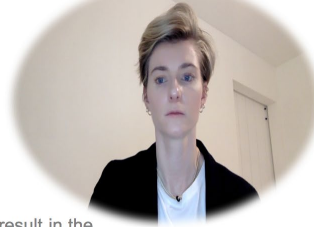
American College of Obstetrics and Gynecology, 2020
Rudin et al, 2021.



OBJECTIVES

1. Address Barriers + Adaptations to Physical Activity and Exercise During Pregnancy
2. Motivational Interviewing for Exercise
3. Counselling Using the 6Rs Framework
4. Contraindications for Physical Activity and Exercise
5. Review Exercise in Pregnancy Guidelines
6. Prescribe Physical Activity and Exercise





Physical Activity Versus Exercise

Physical Activity

- Any body movements that result in the utilization of energy
- Little to no structure
- No intended plan to improve or maintain fitness
- Ex: Household and occupational tasks, gardening, walking to work, dancing

Exercise

- Body movements that result in the utilization of energy and are planned, structured, repetitive
- Intended to improve or maintain fitness
- Ex: Going for a walk every day, group workout for 30 minutes three times a week, swimming every other day

Dasso, 2019

 **How the Body Changes**
➤ **DURING PREGNANCY** ◀



Weight gain:

- Women of normal weight should gain around **25 to 35 pounds** over the course of their pregnancies.
- Most of the weight goes to the abdomen, which shifts a woman's **center of gravity**.

Blood flow:

- **Changing hormones** increase the elasticity and volume of the circulatory system.
- This means the body **pumps blood** at a rate it isn't used to in order to accommodate a growing baby.

Oxygen intake:

- **Lung function** improves during pregnancy.
- An increase in the depth of each breath increases the amount of air a pregnant woman inhales by up to **50%** or more.

Flexibility:

- Pregnancy increases the hormone **relaxin**, which is responsible for making ligaments and tissues more elastic.
- This can give women a false sense of flexibility, which increases the risk for **tears and sprains**.

Barriers to PAE and Physiological Adaptations During Pregnancy

Physiologic Changes of Pregnancy and Their Potential Impact on PAE

Other Barriers

- Limited off-site community resources
- Lack of social support
- Low community engagement
- Low perceived benefits and attitudes
- Affordability
- Accessibility
- Lack of childcare
- Increased exposure to stressful events
- Work hour constraints



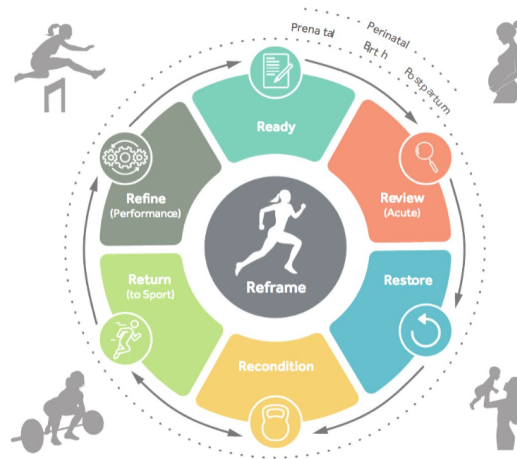
- Systemic and structural racism
- Lack of access to public green and safe spaces and pedestrian environments
- Negative psychological and social impact of the tridemic (COVID-19, RSV, and Influenza)
- Physical discomforts of pregnancy such as fatigue, nausea, low back pain, and cramping



Okafor & Goon, 2022

Four Key Principles of MI





Donnelly et al., 2022



Ready

Educate

Ready the athlete for anticipated whole-systems, biopsychosocial changes by proactively educating them about perinatal health considerations during the transition into pregnancy and motherhood (e.g., weight-gain, pelvic floor function, perinatal mental health). Aim to maintain exercise throughout pregnancy (where it is safe to do so for the mother and baby), limit deconditioning and optimise postpartum recovery with forward planning.

Review

Evaluate

Review and evaluate the postpartum athlete and address acute musculoskeletal and pelvic health rehabilitation needs. Screen for whole-systems, biopsychosocial considerations.*

Restore

Treat/Refer

Restore physical and psychological wellbeing depending on individual needs and prepare the perinatal athlete for returning to structured training environments. Include pelvic floor rehabilitation and other relevant whole-systems considerations.



Donnelly et al., 2022

Recondition

Graded Exposure

Recondition the perinatal athlete for their required physical and psychological sporting demands. Commence graded exposure towards individual-specific training load requirements. Revisit whole-systems, biopsychosocial considerations and monitor symptoms as training increases.

Return

Full Exposure

Return-to-sport through an individualised, evidence-informed and guided exposure to the competitive environment and re-evaluate regularly.

Refine

Continue Care

Refine whole-systems, biopsychosocial strategies (e.g., optimise sleep quality, monitor for signs of relative energy deficiency syndrome) to enhance athlete training and competition availability, retaining the athlete in their sport and optimising performance.



Contraindications

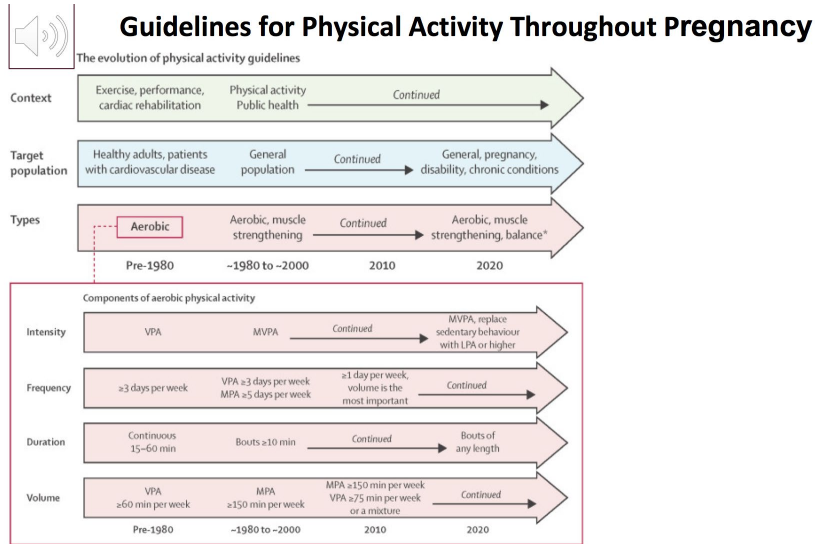
The following are absolute contraindications to exercise:

- Ruptured membranes.
- Premature labour.
- Unexplained persistent vaginal bleeding.
- Placenta praevia after 28 weeks' gestation.
- Pre-eclampsia.
- Incompetent cervix.
- Intrauterine growth restriction.
- High-order multiple pregnancy (eg, triplets).
- Uncontrolled type I diabetes.
- Uncontrolled hypertension.
- Uncontrolled thyroid disease.
- Other serious cardiovascular, respiratory or systemic disorder.

The following are relative contraindications to exercise:

- Recurrent pregnancy loss.
- Gestational hypertension.
- A history of spontaneous preterm birth.
- Mild/moderate cardiovascular or respiratory disease.
- Symptomatic anaemia.
- Malnutrition.
- Eating disorder.
- Twin pregnancy after the 28th week.
- Other significant medical conditions.





Guidelines Continued

1

All women without contraindication should be physically active throughout pregnancy.

Specific subgroups were examined:

- Women who were previously inactive.
- Women diagnosed with gestational diabetes mellitus.
- Women categorized as overweight or obese (pre-pregnancy body mass index ≥ 25 kg/m²).



2

Intensity @ 64-76% of age based max HR or talk test

3

30-60 min 3-7 times per week

4

Pregnant women should incorporate a variety of aerobic and resistance training activities to achieve greater benefits. Adding yoga and/or gentle stretching may also be beneficial.

5

Pelvic floor muscle training (e.g., Kegel exercises) may be performed on a daily basis to reduce the risk of urinary incontinence. Instruction in proper technique is recommended to obtain optimal benefits.

6

Modify exercise as needed

What's Missing?

-Vigorous exercise - 77-93% of age based max HR

-High intensity interval training (HIIT)

-CrossFit

-Elite + endurance athletes

Limited discussion on:

-Heart rate >140bpm

-Lifting > 20lbs



3 Ps

PAIN – lumbopelvic

PRESSURE – vaginal heaviness

PASSAGE – leaking urine, stool, or gas



Running head: ANTENATAL EXERCISE COUNSELING 14

Exercise is Medicine Initiative (EIM)



Physical Activity Vital Sign

Exercise is Medicine

1. Do you engage in any physical activity on a regular basis?
 2. Do you engage in any physical activity on a regular basis?
 3. Do you engage in any physical activity on a regular basis?

Using the Physical Activity Vital Sign

1. A score of 1 or 2 indicates you are not meeting the recommended level of physical activity. This score indicates you are not meeting the recommended level of physical activity.

What's Moderate Intensity?

Examples: brisk walking, swimming, water aerobics, water-based fitness, etc.

What's Vigorous Intensity?

Examples: jogging, fast bicycling, singles tennis, aerobic exercise class, swimming laps, etc.

The Physical Activity Vital Sign - Additional Option

1. Do you engage in any physical activity on a regular basis?

2018 Physical Activity Guidelines for Adults

1. Do 150 minutes or more of moderate-intensity aerobic activity or 75 minutes or more of vigorous-intensity aerobic activity each week. Equivalent combinations of moderate- and vigorous-intensity activity are acceptable.

Aerobic Activity (aerobics)

Frequency: 1-5 days per week
 Intensity: Moderate (150-300 min/week) or Vigorous (75-150 min/week)
 Type: Any type of aerobic activity that gets your heart rate and breathing up.

Muscle Strength (endurance)

Frequency: 2-3 days per week
 Intensity: Moderate to vigorous (at least 8-10 repetitions of 8-12 exercises)

Flexibility (stretching)

Frequency: 3-7 days per week
 Intensity: Moderate (at least 10-15 minutes)

American College of Sports Medicine, 2020
 Joy et al., 2013
 CSEP/SCPE

Clinical Scenarios

Alysha

Narration

Promo

Character

HEALTH CARE PROVIDER CONSULTATION FORM FOR PRENATAL PHYSICAL ACTIVITY

CSEP/SCPE

Name: _____ Date: _____

2018 Physical Activity Guidelines for Adults

1. Do 150 minutes or more of moderate-intensity aerobic activity or 75 minutes or more of vigorous-intensity aerobic activity each week. Equivalent combinations of moderate- and vigorous-intensity activity are acceptable.

Aerobic Activity (aerobics)

Frequency: 1-5 days per week
 Intensity: Moderate (150-300 min/week) or Vigorous (75-150 min/week)
 Type: Any type of aerobic activity that gets your heart rate and breathing up.

Muscle Strength (endurance)

Frequency: 2-3 days per week
 Intensity: Moderate to vigorous (at least 8-10 repetitions of 8-12 exercises)

Flexibility (stretching)

Frequency: 3-7 days per week
 Intensity: Moderate (at least 10-15 minutes)

Relative contraindications

1. Unstable coronary artery disease

2. Unstable angina

3. Aortic dissection

4. Aortic aneurysm

5. Dissecting aortic aneurysm

6. Hypertrophic cardiomyopathy

7. Myocarditis

8. Pericarditis

9. Pulmonary hypertension

10. Significant arrhythmias

11. Syncope

12. Unexplained exertional dyspnea

13. Unexplained exertional lightheadedness or dizziness

14. Unexplained exertional fatigue

15. Unexplained exertional chest pain

16. Unexplained exertional palpitations

17. Unexplained exertional leg pain

18. Unexplained exertional swelling

19. Unexplained exertional cyanosis

20. Unexplained exertional hemoptysis

21. Unexplained exertional syncope

22. Unexplained exertional loss of consciousness

23. Unexplained exertional seizure

24. Unexplained exertional stroke

25. Unexplained exertional myocardial infarction

26. Unexplained exertional sudden cardiac death

27. Unexplained exertional death

28. Unexplained exertional death of unknown cause

29. Unexplained exertional death of unknown cause

30. Unexplained exertional death of unknown cause

Reframing “You’re Cleared for Exercise”

**BE THE
CHANGE**

Questions? Reach out! mfrazier@seattleu.edu





Check your inbox for the *Qualtrics Post-Evaluation Survey!*



Resources pdf

**Supporting Pregnant People in Prenatal Physical Activity & Exercise:
Resources to Facilitate Counseling by
Healthcare Providers**

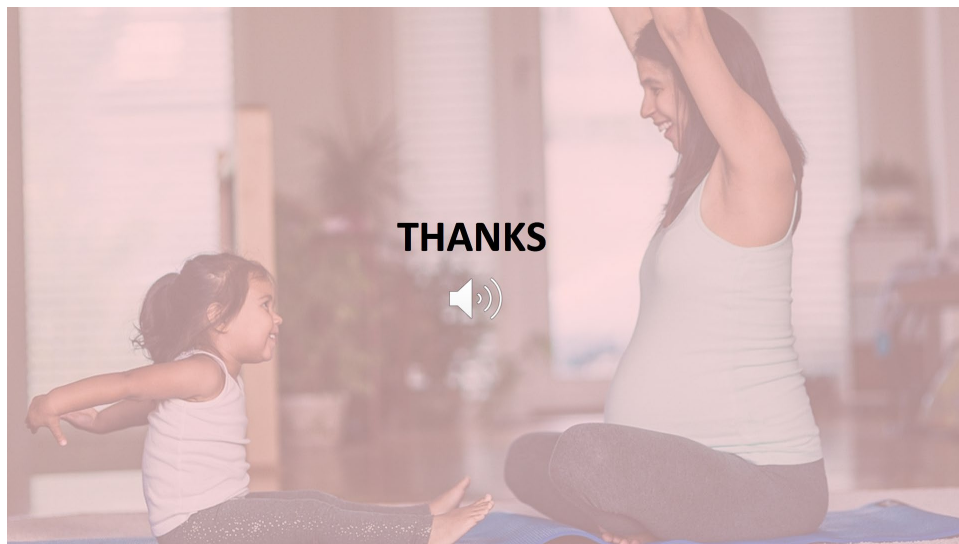


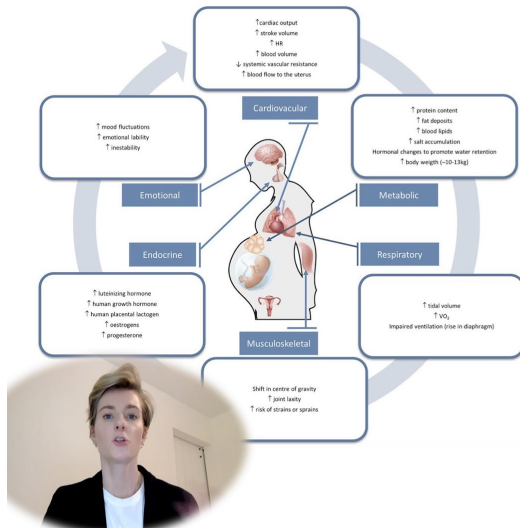
CLICK

- Consultation Form
Exercise Guidelines
- EIM PAVS Form
- EIM Prescription Form
- 6 Rs Framework

Evidence-based resources to promote prenatal physical activity and exercise

BY MO FRAZIER





Barriers to PAE and Physiological Adaptations During Pregnancy

Physiologic Changes of Pregnancy and Their Potential Impact on PAE

Cardiovascular – Blood volume, cardiac output, ventricular mass increase. Blood pressure decreases*

Respiratory – Diaphragm rises, chest circumference increases, thoracic breathing becomes more common, lung capacity decreases

Metabolic – Basal metabolic rate increases, insulin resistance, increased sweating

Musculoskeletal – Increased lordosis, rounded shoulders, mobility of the pelvic joints

Genetics – Fascia of the abdominal wall spread out to accommodate the growing baby and pressure on the core system, some women have a genetic predisposition to have some degree of a separation at the linea alba, even prior to pregnancy

Barakat et al, 2015, Blotta et al, 2018

Motivational Interviewing

<p>OPEN-ENDED QUESTIONS</p> <p>ALLOW FLEXIBILITY IN RESPONSES</p>	<p><i>What do you know about exercising during pregnancy?</i></p> <p><i>How ready do you feel about changing your exercise patterns and/or lifestyle behaviors?</i></p> <p>Some people don't want to talk about exercise at all, where as some people don't mind at all. How do you feel about this?</p>
<p>AFFIRMATIONS</p> <p>POSITIVE COMMENTS ON BEHAVIOR OR MOTIVATION</p>	<p>You've made a lot of effort to include exercise in your weekly schedule!</p> <p>You are making time for exercise because you love your body and you want to take care of it.</p> <p>You are being patient with yourself as you navigate improving your fitness/starting your fitness journey. It's never too late to start exercising. When you are ready, I am here to support you.</p>
<p>REFLECTIONS</p> <p>MIRRORING THE PATIENT'S 'MEANING' OF STATEMENT</p>	<p>Patient: I want to exercise more but I don't want to harm the baby.</p> <p>HCP: You would be more active if you knew how to safely participate in exercise while pregnant.</p> <p>Patient: I am sick of people telling me I should try and exercise, who even has time for that?</p> <p>HCP: You would be more active if you could free up a few more minutes in your day.</p>
<p>SUMMARIZATIONS</p> <p>OVERVIEW OF IMPORTANT COMPONENTS OF PATIENT'S COMMUNICATION</p>	<p>To summarize our conversation so far, despite how hard it's been to find time to be active, you are willing to keep trying to fit it in. Between your family and your job, you manage a lot. I know that you can do this too.</p>

McNeil et al, 2017

Guidelines for Physical Activity Throughout Pregnancy



GDM



GH + PE

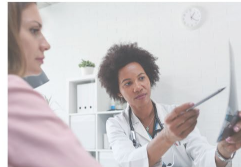


PERINATAL DEPRESSION



MACROSOMIA

Mottolla et al., 2018, American College of Obstetrics and Gynecology, 2020



PRESSURING
FIXING
CONTROLLING

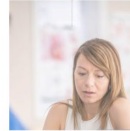
"You must"
"You should"
"You have to"
"It's important"



INVALIDATION



FORCED SOLUTIONS
CONFRONTATION

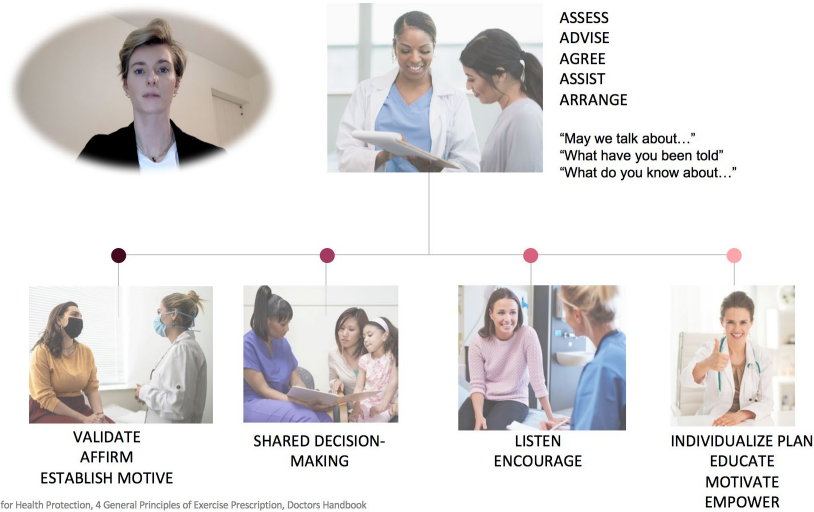


CONFLICTING
MESSAGING



UNDERMINING
SELF - EFFICACY

Centre for Health Protection, 4 General Principles of Exercise Prescription, Doctors Handbook



Key Resources:

Barakat, R., Perales, M., Garatachea, N., Ruiz, J. R., & Lucia, A. (2015). Exercise during pregnancy. A narrative review asking: what do we know?. *British journal of sports medicine, 49*(21), 1377–1381. <https://doi.org/10.1136/bjsports-2015-094756>

Beetham, K. S., Giles, C., Noetel, M., Clifton, V., Jones, J. C., & Naughton, G. (2019). The effects of vigorous intensity exercise in the third trimester of pregnancy: a systematic review and meta-analysis. *BMC pregnancy and childbirth, 19*(1), 281. <https://doi.org/10.1186/s12884-019-2441-1>

Blotta, R. M., Costa, S. D. S., Trindade, E. N., Meurer, L., & Maciel-Trindade, M. R. (2018). Collagen I and III in women with diastasis recti. *Clinics (Sao Paulo, Brazil), 73*, e319. <https://doi.org/10.6061/clinics/2018/e319>

Dasso N. A. (2019). How is exercise different from physical activity? A concept analysis. *Nursing forum, 54*(1), 45–52. <https://doi.org/10.1111/nuf.12296>

Joy, E. A., Mottola, M. F., & Chambliss, H. (2013). *Current Sports Medicine Reports, 12* (4), 245-247. doi: 10.1249/JSR.0b013e31829a6f7e.

Joy, E. A., Mottola, M. F., & Chambliss, H. (2013). Integrating exercise is medicine® into the care of pregnant women. *Current sports medicine reports, 12*(4), 245–247. <https://doi.org/10.1249/JSR.0b013e31829a6f7e>

McNeil, D.W., Addicks, S.H., & Randall, C.L. (2017). Motivational Interviewing and Motivational Interactions for Health Behavior Change and Maintenance.

Mottola, M. F., Davenport, M. H., Ruchat, S. M., Davies, G. A., Poitras, V. J., Gray, C. E., Jaramillo Garcia, A., Barrowman, N., Adamo, K. B., Duggan, M., Barakat, R., Chilibeck, P., Fleming, K., Forte, M., Korolnek, J., Naggal, T., Slater, L. G., Stirling, D., & Zehr, L. (2018). 2019 Canadian guideline for physical activity throughout pregnancy. *British journal of sports medicine, 52*(21), 1339–1346. <https://doi.org/10.1136/bjsports-2018-100056>

Okafor, U. B., & Goon, D. T. (2022). Uncovering Barriers to Prenatal Physical Activity and Exercise Among South African Pregnant Women: A Cross-Sectional, Mixed-Method Analysis. *Frontiers in public health, 10*, 697386. <https://doi.org/10.3389/fpubh.2022.697386>

Other notable resources that helped inform this presentation:

- Bauer, P. W., Broman, C. L., & Pivarnik, J. M. (2010). Exercise and pregnancy knowledge among healthcare providers. *Journal of women's health* (2002), 19(2), 335–341. <https://doi.org/10.1089/jwh.2008.1295>
- Cannon, S., Lastella, M., Vincze, L., Vandelanotte, C., & Hayman, M. (2020). A review of pregnancy information on nutrition, physical activity and sleep websites. *Women and birth : journal of the Australian College of Midwives*, 33(1), 35–40. <https://doi.org/10.1016/j.wombi.2018.12.007>
- Centers for Disease Control and Prevention: Lower direct medical costs associated with physical activity [article online]. Available from <http://www.cdc.gov/od/oc/media/pressrel/r2k1006a.htm>. Accessed 15 December 2008
- Donnelly, G. M., Moore, I. S., Brockwell, E., Rankin, A., & Cooke, R. (2022). Reframing return-to-sport postpartum: the 6 Rs framework. *British journal of sports medicine*, 56(5), 244–245. <https://doi.org/10.1136/bjsports-2021-104877>
- France-Ratcliffe, M., Hopkins, N. D., Low, D. A., Cocks, M. S., Jones, H., Sheen, K. S., & Sprung, V. S. (2022). Perceptions of Antenatal Exercise in Pregnant Females and the Impact of COVID-19. *International journal of environmental research and public health*, 19(17), 10635. <https://doi.org/10.3390/ijerph191710635>
- Haakstad, L., Mjønerud, J., & Dalhaug, E. M. (2020). MAMMA MIA! Norwegian Midwives' Practices and Views About Gestational Weight Gain, Physical Activity, and Nutrition. *Frontiers in psychology*, 11, 1463. <https://doi.org/10.3389/fpsyg.2020.01463>
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- Malta, M. B., Carvalhaes, M. A., Takito, M. Y., Tonete, V. L., Barros, A. J., Parada, C. M., & Benício, M. H. (2016). Educational intervention regarding diet and physical activity for pregnant women: changes in knowledge and practices among health professionals. *BMC pregnancy and childbirth*, 16(1), 175. <https://doi.org/10.1186/s12884-016-0957-1>
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- Melton, B., Marshall, E., Bland, H., Schmidt, M., & Guion, W. K. (2013). American rural women's exercise self-efficacy and awareness of exercise benefits and safety during pregnancy. *Nursing & health sciences*, 15(4), 468–473. <https://doi.org/10.1111/nhs.12057>
- Okafor, U. B., & Goon, D. T. (2022). Uncovering Barriers to Prenatal Physical Activity and Exercise Among South African Pregnant Women: A Cross-Sectional, Mixed-Method Analysis. *Frontiers in public health*, 10, 697386. <https://doi.org/10.3389/fpubh.2022.697386>
- Stotland, N. E., Gilbert, P., Bogetz, A., Harper, C. C., Abrams, B., & Gerbert, B. (2010). Preventing excessive weight gain in pregnancy: how do prenatal care providers approach counseling?. *Journal of women's health* (2002), 19(4), 807–814. <https://doi.org/10.1089/jwh.2009.1462>
- Watson, E. D., Oddie, B., & Constantinou, D. (2015). Exercise during pregnancy: knowledge and beliefs of medical practitioners in South Africa: a survey study. *BMC pregnancy and childbirth*, 15, 245. <https://doi.org/10.1186/s12884-015-0690-1>
- Wee CC, McCarthy EP, Davis RB, Phillips RS. Physician Counseling About Exercise. *JAMA*. 1999;282(16):1583–1588. doi:10.1001/jama.282.16.1583

Appendix D

Resource Toolkit for Healthcare Providers

**Supporting Pregnant People in Prenatal
Physical Activity & Exercise:
Resources to Facilitate Counseling by
Healthcare Providers**



CLICK

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Exercise Guidelines
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-  6 Rs Framework

Evidence-based resources to
promote prenatal physical activity
and exercise

BY MO FRAZIER

Appendix E


CANVA Flyer



You are **invited** to participate in a study to evaluate the effect of a brief in-service training on providers' attitudes, beliefs, knowledge, and practices pertaining to antenatal physical activity and exercise.

This study aims to determine if a brief in-service training:
a) bridges the gap between clinical knowledge and current recommendations for exercise promotion, and
b) increases provider confidence in physical activity and exercise prescription.


Pre-Evaluation Survey

 10 minutes to complete




Address Barriers
Motivational Interviewing
6 Rs Framework

Online In-Service Video

 55 minutes
(plus 30 minutes of additional optional material)

Contraindications
Guidelines
Prescribe

Post-Evaluation Survey

 20 minutes to complete



MUST BE:

- **At least 18 years old AND**
- **Licensed Healthcare Professional**
- **Not a student practitioner**

Principal Investigator: **Mo Frazier DNP Student**
CNM Class of '23
Seattle University, College of Nursing
Mailbox : mfrazier@seattleu.edu

Appendix F

Seattle University

Consent to Participate in Research

I'm inviting you to participate in a research study *Supporting Pregnant People in Prenatal Physical Activity & Exercise: Brief In-Service Training Integrating the 6 Rs Framework to Facilitate Counseling by Healthcare Professionals* to evaluate the effect of an online, brief in-service training on healthcare professionals' (i.e., Certified Nurse-Midwives and Licensed Midwives) attitudes, beliefs, knowledge, and practices pertaining to antenatal physical activity and exercise. I want to determine if a brief in-service training a) bridges the gap between clinical knowledge and current recommendations for physical activity and exercise promotion, and b) increases provider confidence in physical activity and exercise prescription.

You will be asked to take a pre-intervention survey, watch a video training, and then take a post-intervention survey for this study. The pre- and post-intervention survey will ask about how you address the impediments to physical activity and exercise (PAE) during pregnancy, how you review current guidelines for antenatal PAE with patients, how you promote PAE, and how you counsel on PAE. The survey will take approximately 15 minutes to complete. Participation in this study is completely voluntary, and you may stop at any time without any consequences.

I will not collect any direct identifiers for this study, but I will be asking what your role is (Licensed Midwife, Certified-Nurse Midwife, RN, LC, SW) at Rainier Valley Birth & Health Center and how many years you have been providing healthcare service. This information is necessary to explore potential differences in healthcare professionals' characteristics (e.g. attitudes, beliefs, knowledge, current practices), and perceived barriers across healthcare professional types.

RISKS

- You may find some questions personal or upsetting. You can skip any questions you don't want to answer, or stop the survey entirely.
- Whenever you provide information online, your data could be intercepted. I'm using Qualtrics, a secure system to collect data, but I can't completely eliminate this risk.
- To minimize the risk of anyone seeing your data who shouldn't, I will make sure:
 - Each participant will be assigned a randomized ID after they complete the pre-evaluation survey. Upon completion of the pre- evaluation survey, participants will receive an email with their random ID inside. This random ID will then be inputted on the post-evaluation survey. The codes will be used to pair pre – post responses for paired t-test analysis to evaluate project outcomes.
 - All electronic data will be stored on a password-protected computer for the online survey software (Qualtrics). The data will be kept for one year.

- The pre and post Qualtrics survey link will be destroyed after I finish collecting and analyzing the data.

Participation in the project will require no monetary cost to you.

I, along with my DNP faculty project mentor Dr. Jennifer Fricas, will have access to the information you provide. If I share my findings in publications or presentations, the results will be de-identified. If I quote you, I'll use pseudonyms (fake names).

If you have any questions about this research, contact Morgan Frazier at mfrazier@seattleu.edu or 916-903-2823. If you have any questions about your rights as a research participant, contact the SU Institutional Review Board at 206-296-2585 / irb@seattleu.edu

If you meet the eligibility criteria below and would like to participate in this study, click the button to begin the survey. Remember, your participation is completely voluntary, and you're free to withdraw at any time.

- I am at least 18 years old AND
- A licensed Healthcare Professional BUT
- NOT a student practitioner

Appendix G

Pre and Post Evaluation Survey Questionnaire

Rate your level of agreement with each statement:	Strongly Disagree 1	Disagree 2	Uncertain 3	Agree 4	Strongly Agree 5
Attitudes					
1. It is important to discuss physical activity and exercise with pregnant patients.					
2. It is important to encourage pregnant patients to engage in 30 minutes of physical activity and exercise each day.					
Beliefs					
3. Sedentary, pregnant patients should not begin an exercise program.					
4. Sedentary, overweight, pregnant patients should not begin an exercise program.					
5. Pregnant patients should decrease their exercise as their pregnancy progresses.					

<p>6. Patients are uncomfortable talking about physical activity and exercise.</p>					
<p>Efficacy</p>					
<p>7. I am confident in knowledge regarding the benefits and risks of physical activity and exercise in pregnancy.</p>					
<p>8. I am confident that the information on physical activity and exercise that I distribute to my pregnant patients is consistent with guidelines.</p>					
<p>9. I am confident in my ability to effectively talk with patients about physical activity and exercise in pregnancy.</p>					
<p>10. I am confident in my ability to effectively talk with overweight and obese pregnant patients about physical activity and exercise.</p>					

Identify the choice that best completes the statement or answers the question.	A	B	C	D	E
<p>11. Patients free of obstetric complications should engage in at least _____ minutes of moderate-intensity physical activity each week to achieve meaningful health benefits and reductions in pregnancy complications.</p>	100	120	150	200	
<p>12. Which of the following patients should NOT be encouraged to be physically active throughout pregnancy?</p>	Patients who were previously inactive	Patients diagnosed with gestational diabetes mellitus	Patients who are categorized as overweight or obese (pre-pregnancy body mass index ≥ 25 kg/m ²)	Patients with unexplained persistent vaginal bleeding	
<p>13. Moderate-intensity physical activity is described as tasks that:</p>	Result in light sweating and/or a slight to moderate increase in breathing or heart rate	Result in the inability to say more than a few words without pausing for a breath	Include walking slowly, sitting at your computer, making the bed, eating, preparing food, and washing dishes		

<p>14. According to the 6 Rs framework, which of the following factors are considered within a whole-systems, biopsychosocial approach to supporting pregnant exercisers?</p>	<p>Childbirth related trauma</p>	<p>Energy balance</p>	<p>Psychological well-being</p>	<p>Fear of movement</p>	<p>All of the above</p>
<p>15. Which of the 6 Rs in the 6 Rs framework proactively educates and supports patients in preparation for the expected whole-systems, biopsychosocial changes during pregnancy?</p>	<p>Ready</p>	<p>Review</p>	<p>Restore</p>	<p>Recondition</p>	<p>Return</p>

Post In-Service Survey Open-Ended Questions

- 16. Describe the training you received as a midwife to advise or counsel pregnant patients about prenatal physical activity and exercise during antenatal visits?
- 17. Provide an example of how you could safely prescribe physical activity and exercise to a pregnant patient using the FITT principle (frequency, intensity, time, and type).
- 18. Was the training material and content helpful to you? Why or why not?

NOTE: Questions 1-10 of this survey are from a tool on assessing provider attitudes, beliefs, and efficacy of counseling on physical activity for pregnant people developed and published by Leiferman and colleagues (Leiferman et al., 2012). Questions 11-15 were developed by the primary investigator of this project, to assess provider knowledge of physical activity guidelines in pregnancy and the 6 Rs Framework, which is used with permission of Donnelly and colleagues (Donnelly et al., 2022). Post-evaluation open-ended questions were developed by the primary investigator of this project to assess provider confidence in physical activity and exercise prescription and to determine if a

brief in-service training bridges the gap between clinical knowledge and current recommendations for physical activity and exercise promotion.

Donnelly, G. M., Moore, I. S., Brockwell, E., Rankin, A., & Cooke, R. (2022). Reframing return-to-sport postpartum: the 6 Rs framework. *British journal of sports medicine*, 56(5), 244–245. <https://doi.org/10.1136/bjsports-2021-104877>

Leiferman, J. , Gutilla, M. , Paulson, J. and Pivarnik, J. (2012) Antenatal physical activity counseling among healthcare providers. *Open Journal of Obstetrics and Gynecology*, 2, 346-355. doi: [10.4236/ojog.2012.24073](https://doi.org/10.4236/ojog.2012.24073).

Knowledge Questions & Answers

Question 1: Patients free of obstetric complications should engage in at least ____ minutes of moderate-intensity physical activity each week to achieve meaningful health benefits and reductions in pregnancy complications

Correct Answer:

- 100
- 120
- 150**
- 200

Question 2: Which of the following patients should NOT be encouraged to be physically active throughout pregnancy?

Correct Answer:

- Patients who were previously inactive
- Patients diagnosed with gestational diabetes mellitus
- Patients who are categorized as overweight or obese (pre-pregnancy body mass index ≥ 25 kg/m²)**
- Patients with unexplained persistent vaginal bleeding**

Question 3: Moderate-intensity physical activity is described as tasks that:

Correct Answer:

- Result in light sweating and/or a slight to moderate increase in breathing or heart rate**
- Result in the inability to say more than a few words without pausing for a breath
- Include walking slowly, sitting at your computer, making the bed, eating, preparing food, and washing dishes

Question 4: According to the 6 Rs framework, which of the following factors are considered within a whole-systems, biopsychosocial approach to supporting pregnant exercisers?

Correct Answer:

- Childbirth related trauma

- Energy balance
- Psychological well-being
- Fear of movement
- **All of the above**

Question 5: Which of the 6 Rs in the 6 Rs framework proactively educates and supports patients in preparation for the expected whole-systems, biopsychosocial changes during pregnancy?

Correct Answer:

- Ready**
- Review
- Restore
- Recondition
- Return