

Perspectives of Midwives and Nurse Practitioners in Kentucky on Exercise Counseling During Pregnancy: A Qualitative Study

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Abstract

Introduction: Healthcare professionals are in an optimal position to deliver exercise information to pregnant women, yet previous research suggests this seldom happens. Midwives and nurse practitioners, who may have more time with pregnant women, are particularly well suited for this role.

Objectives: This qualitative study examined the exercise advice and counseling provided by midwives and nurse practitioners in Kentucky, focusing on the barriers they face.

Methods: Twenty-one midwives and nurse practitioners were recruited until the sample size reached saturation. A survey with open-ended questions was distributed to potential participants in regional hospitals, universities, and professional associations. The framework method was employed to identify common themes in the responses from participants.

Results: Five main themes emerged: nature of advice, discussing exercise benefits, safety concerns, barriers to counseling, and suggestions for improvement. Findings revealed that midwives and nurse practitioners recommend moderate exercise, aiming for 150 min weekly, monitoring heart rate for intensity, continuing prepregnancy exercise routines, starting low-intensity exercise during pregnancy such as walking, slowing down as pregnancy advances, and avoiding heavy lifting and vigorous activities. Many midwives and nurse practitioners in our sample took a reactive approach to exercise counseling, providing exercise advice if pregnant women asked questions or if they were at high risk for hypokinetic diseases. It was also observed that midwives and nurse practitioners discussed the maternal benefits of exercise more than the fetal benefits. Only a few nurse practitioners and midwives were content with their counseling, while the majority did not feel their counseling was effective.

Conclusions: Many midwives and nurse practitioners in Kentucky provided comprehensive and accurate physical activity guidelines to pregnant women. However, there is room for them to improve: proactive counseling should include discussions on fetal benefits and using the “talk test” for exercise intensity. Advising patients to slow down as pregnancy progresses should be reconsidered, and evidence-based guidance on specific exercises should be prioritized.

Keywords

midwifery, physical activity, nursing education, obstetrics, health promotion

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Introduction

Exercising during pregnancy can benefit both the mother and child, promoting healthier outcomes for two generations. Exercising during pregnancy reduces the risk for many complications, including excessive gestational weight gain, gestational diabetes mellitus, gestational hypertension, depression, macrosomia, and preterm birth (Aune et al., 2016; Davenport et al., 2018; Kołomańska et al., 2019; Magro-Malosso et al., 2017; Ruchat et al., 2018). Exercise during pregnancy attenuates the fetal programming of hypokinetic diseases and improves both short- and long-term health of mothers and newborns (Barker, 1990; Tinius et al., 2017). Pregnant women should aim for at least 150 min of moderate-intensity aerobic physical activity weekly to maximize health benefits (American College of Obstetricians and Gynecologists, 2020; Bull et al., 2020; U.S. Department of Health and Human Services, 2018). Despite recommendations, most pregnant women avoid exercising for a myriad of reasons, some of which include fear of miscarriage, discomfort, societal pressure, and conflicting advice (Harrison et al., 2018; Poudevigne & O'Connor, 2006).

Obstetric providers such as obstetricians, nurse practitioners, and midwives can potentially influence and improve pregnant women's exercise participation because most pregnant women are receptive to the advice provided by health professionals to improve the health and well-being of the growing fetus (Phelan, 2010; Stotland et al., 2010; Whitaker et al., 2016). Regular visits to maternal clinics increase the opportunity to follow-up and provide continuous feedback (Phelan, 2010). Thus, pregnancy is often seen as a powerful "teachable moment" to start making positive lifestyle changes (Phelan, 2010).

Review of Literature

The communication between pregnant women and providers regarding exercise during pregnancy is not comprehensive and does not meet the expectations of pregnant women (Tinius et al., 2020). Previous research suggests that pregnant women assume lifestyle counseling is not a priority for obstetric providers and seek advice only for clinically significant issues within the limited time available for consultations (Stengel et al., 2012). In contrast, providers assume pregnant women have a lack of interest in exercising during pregnancy and may try to avoid additional topics (Whitaker et al., 2016). Lack of knowledge about exercise among health professionals is also a reason not to initiate such discussions on exercise during pregnancy at maternal clinics (Stengel et al., 2012; Stotland et al., 2010; Whitaker et al., 2016), where, if started, pregnant women often get confused due to vague or conflicting advice received from their obstetric providers (Stengel et al., 2012). As a result, pregnant women usually remain inactive during pregnancy, following nonprofessional advice from family and friends (Wagnild & Pollard, 2020).

Thus, it is crucial to provide maternal physical activity and exercise counseling in maternal clinics to reduce sedentary time and promote physical activity and exercise during pregnancy, thereby impacting the health of two generations.

The content and quality of advice regarding maternal physical activity and exercise pregnant women receive from their obstetric providers are not clear (Stengel et al., 2012). Information about barriers to advising on maternal physical activity and exercise is also lacking and should be further investigated (Phelan, 2010). Such evidence is more limited in rural regions where the prevalence of physical inactivity and healthcare disparities are high (American College of Obstetricians and Gynecologists, 2014; Patterson et al., 2004). Such studies are vital in rural settings because healthcare providers in rural areas have more responsibility for identifying and advising inactive people to help them become more active (Patterson et al., 2004). Highlighting disparities in patient-provider communication on the topic in rural areas, a study in rural Kentucky found that although all providers self-reported discussing exercise habits with their obstetric patients, nearly half of the patients did not recall receiving counseling about exercise from their obstetric providers (Blankenship et al., 2020). However, that study included five obstetricians and one nurse practitioner from a single obstetrics clinic, whereas no midwives were included (Blankenship et al., 2020). Due to the shortage of obstetricians and time constraints in busy maternal clinics in rural areas, obstetricians may need the help of midwives and nurse practitioners in nonclinical aspects of pregnancy, such as providing lifestyle advice (Avery et al., 2020; Kramer et al., 2022; Probst et al., 2002). Midwives and nurse practitioners are more aware of counseling techniques (Bauer et al., 2010; Stotland et al., 2010; Yankou et al., 1993), have more frequent contact with pregnant women, and tend to spend more time on lifestyle counseling (Bauer et al., 2010; Stotland et al., 2010; Weir et al., 2010). Thus, exploring the content and quality of advice midwives and nurse practitioners provide regarding exercising during pregnancy is warranted.

Purpose/Objectives

A qualitative study was designed to explore the advice and counseling provided by midwives and nurse practitioners in Kentucky regarding exercising during pregnancy and the barriers to discussing exercise with pregnant women.

Methods

Design

This qualitative study utilized an online survey that included open-ended questions to understand the perspectives of midwives and nurse practitioners towards exercise counseling during pregnancy and barriers to counseling at prenatal clinics. The study procedures and findings are presented in

accordance with the Standards for Reporting Qualitative Research (O'Brien et al., 2014).

Sample

Midwives and nurse practitioners working with pregnant women at any healthcare facility in Kentucky were solicited to participate in the study. Ten participants were recruited for the initial sample using the snowball sampling method (Moser & Korstjens, 2018). However, since the stopping criterion for data saturation had not been reached with this sample size, we continued data collection until we reached a total of 18 participants. To ensure that we had reached the point of data saturation, we subsequently recruited three additional participants, but no new themes emerged from their responses (Francis et al., 2010).

Inclusion and Exclusion Criteria

Nurse practitioners and midwives who agreed to participate and work with pregnant women at healthcare facilities in Kentucky were included in the sample. Conversely, those not working with pregnant women and not working in Kentucky at the time of the study invitation were excluded.

Data Collection

The investigators emailed the study invite to potential participants at regional hospitals and universities utilizing professional networks. Additionally, members of a mid-south state organization for nurse practitioners and nurse midwives were asked to complete the survey. A recruitment flyer was also posted on various social media platforms to reach a wider audience. Interested subjects responded to two screening questions by clicking a link or scanning the QR code in the email invite or recruitment flyer. The two screening questions verified whether the respondents were currently practicing midwives or nurse practitioners in the state of Kentucky and if they were currently treating obstetric patients (Supplementary Appendix A). Eligible individuals were then directed to an implied consent document. Consented participants proceeded to an online qualitative survey distributed to participants through the Qualtrics software (Qualtrics, Provo, UT, United States). Upon completing the online qualitative survey, participants received a \$20 Amazon Gift card as a token of appreciation for their time. The study was conducted from 16 February to 19 April 2024.

Online Survey

The online survey included open- and closed-ended questions (Supplementary Appendix A). Questions and prompts used in the survey were selected based on previous qualitative and quantitative studies on the same topic (Bauer et al., 2010; Blankenship et al., 2020; Tinius et al., 2020).

Each closed-ended question was followed by open-ended questions asking participants to elaborate on their answers. Open-ended surveys are more suitable for busy healthcare providers than face-to-face interviews, where participants can respond conveniently, reducing the responses' socially desirable bias due to high anonymity (Terry & Braun, 2017). This method also reduces transcription errors and misinterpretation of participants' ideas (Terry & Braun, 2017). Each open-ended question was carefully designed to ask only one fact at a time, where clear instructions and prompts with examples were provided to encourage participants to provide complete and comprehensive answers (Terry & Braun, 2017). At the end of the survey, a question was included for participants to describe anything else they could not discuss throughout the survey, but that is important and relevant to the topic (Terry & Braun, 2017). Three exercise physiologists and an advanced practice registered nurse competent in qualitative research validated the survey at face level.

Data Analysis

The open-ended questions were analyzed using the framework method, which included familiarizing with data, coding, constructing an analytical framework, and developing a framework matrix (Gale et al., 2013). The framework method was employed because it is the best to identify recurring themes in textual data using a combination of deductive and inductive approaches, checks if there is sufficient evidence for a proposed theme, and the framework method best aligns with our sampling technique (Gale et al., 2013). The lead author carefully reviewed the responses to open-ended questions multiple times to become familiar with the content. Two coders independently coded a sample of open-ended questions and developed a descriptive-analytical framework (Gale et al., 2013), where this framework also considered themes of previous similar studies (Chang et al., 2013; Hopkinson et al., 2018; Okafor & Goon, 2021; Stotland et al., 2010). The principal investigator coded the remaining surveys according to the analytical framework, refined codes, and organized the codes in a hierarchical structure using the NVivo qualitative data analysis software, Version 14, 2023 (Lumivero, LLC, Denver, CO, United States). All new codes were discussed with the second coder and approved by a third coder who independently coded a random subset of transcripts. All three coders are graduate students with expertise in qualitative data analysis techniques. Two of the coders are exercise physiologists, and the other one is an information systems specialist. The information systems specialist was involved in the data analysis to offer impartial insights into the process.

Institutional Review Board Approval

The study protocol was approved by the Institutional Review Board at Western Kentucky University (IRB# 24-192).

Implied consent was obtained from participants before the data collection, providing information about the study's nature and purpose, procedure, potential risks, benefits, confidentiality, and withdrawal of participation.

Results

Thirty-three participants responded to the survey, and after removal of respondents who were ineligible ($n=8$), did not respond to questions ($n=3$), and repeated responses ($n=1$), 21 respondents remained and were included in the study.

Sample Characteristics

The sample included midwives and nurse practitioners with a mean age of 41.86 ± 8.86 years. Table 1 summarizes other sociodemographic characteristics of the sample.

Research Question Results

All midwives and nurse practitioners acknowledged the maternal, fetal, and newborn benefits of exercising during pregnancy. Many midwives and nurse practitioners ($n=20$; 95.2%) discussed these benefits with pregnant women and advised them ($n=21$; 100%) to exercise during pregnancy. Many midwives and nurse practitioners ($n=18$; 85.7%) also claimed that pregnant women asked questions about exercising during pregnancy. Almost all midwives and

nurse practitioners ($n=20$; 95.2%) recognized the necessity of digital tools for exercise counseling at prenatal clinics. The responses of the midwives and nurse practitioners to open-ended questions were categorized into themes and sub-themes and are presented in Table 2.

Nature of Advice

Many nurse practitioners and midwives in our sample provided comprehensive information about physical activity guidelines to pregnant women, including information about the frequency and intensity of exercise, while some even gave examples of safe types of exercise in pregnancy. For example, one participant's quote included information about frequency, intensity, and type of exercise they recommend to their obstetric patients: "Recommend types of exercises that are safe, e.g., yoga, weightlifting, running, walking, aerobics, stationary bike, swimming, etc. Recommend # of minutes (150 minutes/week), heart rate targets during exercise (150-170 bpm), increasing hydration while exercising" (HCP 06). Nurse practitioners and midwives encouraged the accumulation of 30 min of moderate exercise daily or 3-5 days a week, which is roughly equal to 150 min per week of physical activity. Many nurse practitioners and midwives referred to heart rate as their primary method for exercise intensity, while only a few referred to potentially more appropriate tests (e.g., the talk test) to monitor exercise intensity during pregnancy. For example, one of our participants

Table 1. Sociodemographic Characteristics of Midwives and Nurse Practitioners.

Variables	Frequency ($n=21$)
Highest professional qualifications	
Bachelor's	1 (4.8%)
Master's	4 (19.0%)
CNM	5 (23.8%)
CPM	2 (9.5%)
APRN	3 (14.3%)
DNP	3 (14.3%)
PhD	1 (4.8%)
MSN, CNM, APRN	2 (9.5%)
Experience in profession	
1-5 years	10 (47.6%)
6-10 years	3 (14.3%)
11-15 years	2 (9.5%)
16-20 years	2 (9.5%)
>20 years	4 (19.0%)
Obstetric practice	
10%	1 (4.8%)
25%	2 (9.5%)
50%	3 (14.3%)
75%	7 (33.3%)
100%	8 (38.1%)

CNM = certified nurse midwife; CPM = certified professional midwife; APRN = advanced practice registered nurse; PhD = doctor of philosophy; DNP = doctor of nursing practice; MSN = master of science in nursing.

Table 2. Themes and Subthemes Raised by Midwives and Nurse Practitioners.

Themes	Subthemes	Example quotes
Nature of advice	Exercise guidance	"My main advice focuses on effort level, and I recommend that they always maintain the ability to carry on a conversation while exercising. I find this an easier goal to manage than a particular heart rate. I recommend at least 30 min [minutes] most days of the week" (HCP 03) "I discussed with them that I do NOT want them to be sedentary in pregnancy. I want them moving at least 30 minutes every day at the minimum. It can look like however they want" (HCP 04) "Recommend types of exercises that are safe, e.g., yoga, weightlifting, running, walking, aerobics, stationary bike, swimming, etc. Recommend # of minutes (150 minutes/week), heart rate targets during exercise (150-170 bpm), increasing hydration while exercising" (HCP 06) "I discuss exercise at the initial intake appointment, even if women are still sick and fatigued. I encourage them to have exercise as a goal as soon as they feel well. I encourage 30 minutes of moderate exercise daily or most days. I explain moderate means their heart rate is elevated, which means they should be a little winded (able to talk but struggle to sing) and they should be sweating. This level should be maintained for 30 minutes daily" (HCP 11) "Well, I usually just tell them that it's recommended to exercise enough to elevate your heart rate for at least 30 minutes on most days" (HCP 12) "Exercise 3-4x [times]/week. 30 min [minutes] 3-4x [times]/week" (HCP 17) "Also discuss modifications to current exercises and when to stop for breaks and proper hydration. I usually recommend 150 minutes per week" (HCP 19) "I'm general, should be able to carry a conversation through activity. Recommend walking, swimming, prenatal yoga" (HCP 20) "If they were already doing an exercise, they can continue that but do not overdue [overdo] it or try to max out, listen to your body, stretch, warm up and cool down, do not start a new exercise program that involves strenuous activity beyond your ability" (HCP 02) "If a patient asks about starting an exercise program while pregnant, I ask them what types of exercise they engaged in prior to pregnancy. If they were runners prior to pregnancy, it's ok to continue running during pregnancy as long as they don't experience abdominal pain or vaginal bleeding. If they were lifting heavy weights prior to pregnancy, they can continue to lift weights, as long as they don't experience abdominal pain or vaginal bleeding" (HCP 06) "Walking is good nothing fancy such as gym membership is necessary. Ok to continue what your body is used to throughout pregnancy such as running" (HCP 07) "If the patient already has an exercise routine, I reassure them that they can continue the same exercise routine. I encourage them to listen to their body and take appropriate breaks for water and rest" (HCP 09) "I recommend continuing exercise that the patient is familiar with i.e., not starting CrossFit if this wasn't routine prior to pregnancy and that heavy exercise may require modification in pregnancy" (HCP 10) "I start with what they already do for exercise. Most women can continue their exercise routine with a few modifications as pregnancy progresses. I suggest walking (briskly), swimming, jogging or running, aerobic exercises, and weightlifting (what they can with arms and legs) because these are accessible to most" (HCP 11) "I tell my patients to continue their workouts and to listen to their bodies. I tell patients who were exercising prior to pregnancy, to continue that regimen as long as they feel comfortable and slow down when they feel like it" (HCP 18) "I discuss with patients that it is healthy to continue exercise they were doing prior to pregnancy with limitations to heavy lifting and contact sports" (HCP 19) "Most of the advice that I give is about risks or certain types of exercise and that they should listen to their bodies with other exercise. I feel like patients do follow this advice because they do not want to put themselves or their baby at risk of falling and abdominal trauma during exercise. Most patients also begin to see and feel their limits and find that they will need to listen to their body because they are not able to do what they previously could, especially later in pregnancy. Some patients do try to push themselves to keep up with their pre-pregnancy exercise routines and then usually report discomfort from it. At that point we again discuss listening to their body and slowing down or taking a break from certain exercises that may be triggering pelvic pain or discomfort. I have had quite a few patients think that they could or would exercise as intensely as they previously did (prior to pregnancy) throughout their whole pregnancy. Usually by mid-way through their third trimester these patients report that they no longer feel that they can or want to exercise in the same way as they thought they would want to at the end of pregnancy. This
	Continue pre-pregnancy exercise	(continued)

Table 2. Continued.

Themes	Subthemes	Example quotes
Discourage specific exercise		is usually due to discomfort (often regular Braxton-Hicks contractions with sustained activity) or due to being tired at the end of pregnancy (lack of energy)" (HCP 22)
		"Yoga, swimming Pilates, barre is useful, but do not overextend the abdominal area too much. Sciatic stretches are good. Do not ride a bike. Use safety equipment" (HCP 02)
		"We talk about the need to enhance placenta circulation and to avoid laying [lying] flat on one's back, to be mindful of changing center of gravity, and to avoid any positions that may cause discomfort. We encourage women to assure they can talk during their exercises" (HCP 05)
Encourage to start low-intensity exercise		"I advise them against anything that could result in a fall or trauma to the abdomen that would increase risk of abortion, e.g., bicycling on the road, contact sports, diving, etc. I also advise against any exercise that requires a pt [patient] to lie flat on their back after 20 weeks gestation (e.g., sit-ups)" (HCP 06)
		"No sit ups. Abdominal work with Pilates and yoga ok but modifications may be needed. After 28w [weeks], do not lie flat on back but slightly tilted" (HCP 07)
		"I suggest avoiding lifting with their core because the abdominal muscles are separating during pregnancy. Avoid exercises that increase fall risk to avoid injury to themselves or baby as balance is different during pregnancy. Avoid overextending or fast twists and turns because Relaxin loosens joints and can make injury more likely than they realize" (HCP 11)
Modifications to exercise as the pregnancy progresses		"Avoid heavy lifting (more than you can lift with just your arm/leg muscles) because you will lose the support of your abdominal muscles at some point and avoid things that involve quick twisting/turning motions as it's easier to injure yourself during pregnancy (because of relaxing [Relaxin])" (HCP 12)
		"Avoid heavy lifting. We advise them to make sure things are modified as needed for pregnancy and that they isolate movements. Swimming is excellent, yoga, dancing, movement is important to good health. Remember center of gravity may be off" (HCP 13)
		"Don't let your heart rate stay above 160 for too long. Don't lift over 50 lbs." (HCP 15)
Frequency of counseling		"What types are safe/not safe. Avoidance of falling during exercise. Typically, no lifting over 25 lbs. unless use to heavier lifting exercises. Walking my best recommendation. Avoid biking, treadmills, horseback riding ice-skating due to fear of falling" (HCP 17)
		"We recommend avoiding contact sports to avoid injury" (HCP 19)
		"Avoid heavy lifting or intense exercise if wasn't already used to that level of activity" (HCP 20)
		"If they were not exercising prior to pregnancy, I recommend they start with walking, yoga, stationary biking, swimming, low-impact aerobics, etc." (HCP 06)
		"If they have no routine, I ask them to consider starting a walking routine, yoga or swimming" (HCP 09)
		"I advise starting slow and low impact if they do not already have an exercise routine: evening walks, swimming etc. I promote the practice of yoga and stretching. I generally encourage patients to seek the exercise that they enjoy and can do safely" (HCP 10)
		"If they aren't already exercising then we talk about how they may need to start slower and work their way up and brainstorm ideas of how they might incorporate exercise into their life" (HCP 12)
		"If patients didn't work out prior to pregnancy, I tell them to start with walking or swimming" (HCP 18)
		"I advise walking if they are not already exercising and building from there" (HCP 19)
		"I don't want them to start something late in 3rd trimester" (HCP 02)
		"If weightlifting, as pregnancy progressing may need to decrease weights if greater than 35-50 lbs. Typically lifting for non-lifters should be limited to 20-30 lbs." (HCP 07)
		"I recommend women start exercising as soon as they feel well enough (typically after the first trimester sickness has passed). I recommend exercise continue throughout pregnancy" (HCP 11)
		"She can continue exercise regimen, but may have to modify it as the pregnancy progresses" (HCP 14)
		"I also advise patients that they should listen to their bodies and slow down or stop if needed. We often discuss the hormone Relaxin and how it can make injury more likely as joints and ligaments loosen and that patient's center of gravity will change during pregnancy" (HCP 22)
		"I always assess it at the first OB [obstetric] visit. Then probably every few visits. I usually mention comfort measures at each visit and that often includes discussing movement" (HCP 04)
		"Typically, I discuss exercise with patients approx. [approximately] 1-2x [times] during the pregnancy. These discussions usually
		(continued)

Table 2. Continued.

Themes	Subthemes	Example quotes
Discussing benefits of exercise with pregnant women		happen between the 1st trimester and 20 weeks" (HCP 06)
		"I usually ask about it in the 2nd trimester at 12-20 weeks for at least 5 minutes at a time" (HCP 09)
		"I follow up on diet and exercise regularly (nearly every appointment) throughout pregnancy. We start discussing it at our first appointment. I follow up at nearly every appointment after" (HCP 11)
		"I discuss it at almost every visit, usually starting around 12 weeks. It doesn't usually take long. I just ask if they have been able to get any exercise" (HCP 12)
		"Talk about around 16 weeks. Revisit as needed and discuss modifications at 24-28 weeks. We talk about it at every appt. [appointment]. We ask about heart rate and what they are doing. They often report feeling better when they exercise" (HCP 13)
		"Usually at their NOB [new obstetric] visits and check in throughout their pregnancy or when they have questions. We also discuss activity when discussing cramping, contractions, etc." (HCP 19)
		"Generally, have 1 short discussion in 2nd trimester when also discussing recommended protein and water intake after nausea has settled" (HCP 20)
	Tailored advice	"At the beginning of pregnancy, I discuss what they're pre-pregnancy routine is. If they did not exercise before pregnancy, I encourage them to start walking and stretching daily. If they already are active, I discuss pregnancy modifications for every trimester. I usually recommend walking, stretches, or yoga if they don't have pre-pregnancy exercise routine. If they do, I suggest modifications that help their center of gravity and avoid harsh jumping/movements. If they have no routine, I tell them to keep it at a conversational pace at the beginning of pregnancy" (HCP 04)
		"Ideally 30 min a day on most days. If this is difficult for them to commit to, then I would ask them to try short bursts of activity for 10 minutes at a time" (HCP 09)
		"I review what they already do for exercise and see if there are other activities I can suggest that may benefit them" (HCP 11)
Offer exercise classes		"I encourage them to start or increase exercise if they are not meeting the recommendation. If they are meeting the recommendation, then I ask if that is going ok for them" (HCP 12)
		"It's an expectation. We offer free yoga classes with our clients on Tuesdays, Thursdays and Saturdays and we offer Hike with the Doc [doctor] several times through the summer. We have a full physical wellness program with strengthening, cardio, and balance work, and we have a complete yoga program" (HCP 05)
Maternal benefits		"Promotes healthy pregnancy, decrease risk of preterm delivery, and healthy weight gain" (HCP 01)
		"About halfway through pregnancy I really start discussing stretches for comfort but also in labor" (HCP 04)
		"Exercise can help pt. [patients] tolerate labor better; decrease length of labor; recover from delivery quicker, etc." (HCP 06)
		"Discuss feel better throughout pregnancy, labor, recovery. Discuss assists with glucose control. Discuss mental wellness benefits" (HCP 07)
		"I do mention the mental health effects when promoting exercise for any of my clients with depression or anxiety both prenatally and postpartum" (HCP 12)
		"We discuss importance of getting heart rate up daily. Making labor more efficient and less discomforts in pregnancy. We discuss the reduction of risk for blood clotting, DVT [deep vein thrombosis] and stroke" (HCP 13)
		"I encourage mothers to at least walk 30ish minutes a day to prevent unnecessary weight gain, heart health, and easier labor" (HCP 16)
		"I discuss the importance of proper weight gain, increased mood, possible quicker labor and decreased risk for gestational diabetes when combined with a healthy diet" (HCP 18)
		"We also discuss a lot the difference between NADLs [natural delivery] (which are still highly encouraged) and exercise" (HCP 19)
		"Exercise and its association with lowered glucose levels is regularly discussed with patients who are working on getting their glucose numbers down, within normal limits" (HCP 22)
Maternal and fetal benefits		"Helping with labor and birth outcomes, reducing risk factors and complications of childbirth, improving mental health and wellness, body health for returning to pre-pregnancy state, muscle stretching to improve common pregnancy discomforts" (HCP 02)
		"Maintaining optimum mobility to help prepare for labor/pelvic mobility, decrease risk to mom and baby both during pregnancy and postpartum, building healthy habits to reduce diabetes and pre-eclampsia risk" (HCP 10)

(continued)

(continued)

Table 2. Continued.

Themes	Subthemes	Example quotes
Safety concerns of pregnant women	Safe limits of exercising	"I discuss the benefits for them and for their babies" (HCP 11) "We discuss always trying at least walking and the benefits for both mom and baby" (HCP 19) "How strenuous can I exercise? Can I do Pilates?" (HCP 03) "Most of them seek my care because they want to be healthy, so their questions are specific to what is safe and what can I do?" (HCP 05) "How many minutes they are allowed to exercise; should they track their heart rate during pregnancy; what exercises are/are not safe during pregnancy; can they exercise throughout their entire pregnancy; what drinks are safe to drink while exercising during pregnancy; is hot yoga safe during pregnancy?" (HCP 06) "Just what to avoid and what is ok especially w [with]/weightlifting and running" (HCP 07) "Most questions are about safety, HR [heart rate] and body temperature guidance" (HCP 09) "Typically question usually regard what is safe, how high can my heart rate get, when do I need to modify etc." (HCP 10) "Usually, they are asking me if a certain exercise is ok or not. Is it ok to run? Is it ok to lift weights? Is it ok to do cross fit? When should I stop? Sometimes they will ask for exercise recommendations" (HCP 12) "Is okay to lift weights? Is running alright? What is heart rate limit?" (HCP 13) "They typically ask about specific lifting considerations-toddlers, large bags of dog food, work" (HCP 16) "Typically, they ask what types of exercise they need to avoid so they do not hurt themselves or their fetus a lot of questions about how much weight they can lift" (HCP 17) "They ask if it's safe and how often they should exercise" (HCP 18) "A lot of focus is on ensuring new moms that exercise is okay with pregnancy and encouraged. Many are concerned during the first trimester" (HCP 19)
	Safety of continuing pre-pregnancy exercise	"They usually ask about specific exercises, if swimming is ok or if they can continue running, etc." (HCP 11) "Most ask if they can continue exercising how they did before. We discuss that and modifications. Many patients are concerned with weightlifting at work and restrictions" (HCP 19) "Patients most often ask about continuing their regular exercise routine or about certain types of exercise and if they are safe to continue in pregnancy. A patient recently asked if she could continue to spar in a martial arts class during her pregnancy. My advice was that sparring should be discontinued during pregnancy due to risk of abdominal trauma, but that she could continue to box, only using a punching bag that would not come into contact with her abdomen. Other patients ask about continuing their exercise routines as pregnancy nears the end and they begin to feel more discomfort or Braxton-Hicks contractions with their activity (especially abdominal and pelvic discomfort)" (HCP 22) "Appointment times do not allow for in depth counseling regarding exercise, but I emphasize the recommendation for regular exercise" (HCP 03)
Barriers to counseling	Time restrictions	"I bring it up on occasion but not regularly due to time constraints during appts [appointments]" (HCP 20) "First prenatal and subsequent visits if weight gain or issues are concerning, at 20 week appt [appointment], 28 week appt [appointment], 30 week if failed glucose, 32 week and that's usually all" (HCP 02)
	Reactive approach	"New OB [obstetric] visit at 7-8 wks. [weeks]. Repeated with a handout. Discuss if diagnosed with gestational diabetes to help manage blood sugars" (HCP 07) "At new OB [obstetric visit] we briefly discuss. I also try to bring up around 24-28 weeks. 5-10 minutes is spent on this unless there are subsequent questions or issues of greater need such as in the instance of excess weight gain or abnormal glucose" (HCP 10) "Typically, at first visit (typically first trimester) then as needed if pts [patients] ask 1-2 minutes" (HCP 17) "I typically talk to patients who bring up the topic and I discuss it with our diabetic pts [patients] to help lower their blood glucose levels" (HCP 18) "I tend to discuss exercise in pregnancy with patients when they ask questions about it, rather than proactively. There is information included about exercise and healthy lifestyle in the handouts/workbook that is given to first-time moms/parents in my practice" (HCP 22)
Efficacy of counseling efforts		"Some find it to [too] hard to make the lifestyle change due to time and other needs" (HCP 01)

(continued)

Table 2. Continued.

Themes	Subthemes	Example quotes
Suggestions for improvement	Suggestions to improve counseling	"I think the ones who have a serious mindset about healthy pregnancies follow advice but also others who do not" (HCP 02) "Most of my patients do not move before pregnancy—so their tolerance of adding it in pregnancy is low. Also, we live in an area where there are no sidewalks or affordable gyms" (HCP 04) "Sometimes, patients also have many barriers to activity at times" (HCP 09) "Because I am following up most women implement some kind of exercise even if it's not to the extent or as often as I recommend" (HCP 11) "Usually, my patients do proceed to incorporate exercise into their life without needing additional discussion of specific health benefits" (HCP 12) "Most patients usually have a routine for exercising or they are not interested in exercising" (HCP 14) "I think they are tired and do not have the energy to put forth the effort to exercise" (HCP 16) "I think they follow my advice because they see the results, they feel better, and they have satisfaction knowing they are doing things to possibly decrease pregnancy/fetal risks" (HCP 18) "Now not all patients may get 150 minutes per week, but they have a goal to strive for" (HCP 19) "I don't feel regular activity is a part of most people's lives before pregnancy and the added physical discomfort and life stress causes most people to rely on their usual comforts more than pushing to eat healthy and exercise. I feel most people feel exercise is a luxury and don't make it a priority" (HCP 20) "When exercise is recommended (walking after meals) to help regulate higher glucose readings, it seems that some patients comply and others do not" (HCP 22)
		"Certainly, reiterate throughout pregnancy may help" (HCP 07) "In general, I believe mothers want to do what is best for their baby. Their questions are usually stemming from that motivation. There are always limiting factors for parents, but I do think they strive to promote best outcomes for themselves and the baby. Women tend to fear excess weight gain, pregnancy complications like diabetes, and difficult labor and hear the benefits of exercise as things they can control and work on. Yes, I do feel more structured conversations surrounding the topic would be helpful" (HCP 10) "Could talk about it a little longer with patients and more frequently throughout their pregnancy" (HCP 17) "I could discuss it with every pt. [patient]" (HCP 18) "Would love more handouts on concise exercise recommendations during pregnancy. Patients are hungry for more information to take home and digest" (HCP 19) "Yes, this questionnaire has made me think that I should be more proactive about exercise counseling during our initial prenatal intake appointment or soon after" (HCP 22) "I think I need more facts on what movements are beneficial for those who already have an established routine. How to safely continue their current routine (running or lifting)" (HCP 04) "There is always room for improvement. I would be interested in evidence-based ways to improve my exercise counseling" (HCP 11)
	Requirement of further education	"I would like safety tips for exercising in pregnancy. Parameters including heart rate and movements that should not be done" (HCP 04) "Specific exercises for pregnancy discomforts, safety of exercise, links to safe exercises" (HCP 09) "Safe exercise, modifications and how to know when to push yourself vs slow down. Info on direct impact on blood sugar. Info on exercise timing" (HCP 10) "I'd love all the benefits to be outlined in an appealing way to help motivate women to exercise. Suggestions of exercises, as I am sure there are many, I am unaware of" (HCP 11) "Any exercises that are especially good for pregnancy. Also, postpartum exercises for the first 3 months to heal diastasis recti and strengthen the pelvic floor" (HCP 12) "Weight training for pregnancy. Cross fit, pelvic floor strengthening, supporting your body in pregnancy/KT [kinesiology taping] tape? chiro etc." (HCP 13) "Exercise ideas for pregnancy, general rules for exercising while pregnant, and concise benefits/education for exercising during pregnancy" (HCP 19) "I would love to see safety information, specific recommendations, and list of benefits of exercise and risks of not exercising" (HCP 20) "Safety in pregnancy with physical activity and pregnancy -Pregnancy yoga, stretching, gently body movement" (HCP 22)
	Suggested topics to be covered in digital resources	

strongly recommended using the talk test instead of monitoring heart rate: “My main advice focuses on effort level, and I recommend that they always maintain the ability to carry on a conversation while exercising. I find this an easier goal to manage than a particular heart rate” (HCP 03). Yet, some nurse practitioners and midwives in the sample only provided information about the exercise duration (e.g., “Ideally 30 minutes a day x 5 days”) without including details about the intensity and examples of safe exercise. Although some nurse practitioners and midwives encouraged pregnant women to continue their prepregnancy exercise regimen, many suggested avoiding heavy lifting and vigorous-intensity exercise, listening to their bodies, and stopping exercise if they feel like stopping. For example, “Don’t let your heart rate stay above 160 for too long. Don’t lift over 50 lbs” (HCP 15). Only one provider advised pregnant women to maintain their prepregnancy exercise routine, regardless of intensity, if they do not experience any warning signs to stop exercise: “If they were runners prior to pregnancy, it’s ok to continue running during pregnancy as long they don’t experience abdominal pain or vaginal bleeding. If they were lifting heavy weights prior to pregnancy, they can continue to lift weights, as long as they don’t experience abdominal pain or vaginal bleeding” (HCP 06). In addition to avoiding heavy lifting and intense exercise, some nurse practitioners and midwives also advised pregnant women to refrain from any activity that increases fall risk and abdominal trauma. A few nurse practitioners and midwives also prescribed not to be involved in activities that need lying flat on the back (i.e., sit-ups) and avoid fast twists. Some nurse practitioners and midwives encouraged pregnant women to start low-impact exercise during pregnancy if they were not exercising before conception. One provider specifically encouraged pregnant women to continue exercising from the first trimester to childbirth without decreasing intensity, while many others recommended slowing down as the pregnancy progressed. Many nurse practitioners and midwives, including those offering exercise classes, advised pregnant women about exercise at every prenatal visit. Many of them also spent sufficient time providing tailored advice by reviewing the pregnant women’s exercise habits. However, a few discussed exercising with pregnant women only once or twice, limiting the discussions to the early stages of gestation, where they increased the counseling frequency only if the client had been diagnosed with any hypokinetic disease.

Discussing the Benefits of Exercise With Pregnant Women

Almost all nurse practitioners and midwives in our sample acknowledged maternal, fetal, and newborn benefits of prenatal exercises. However, most of them only discussed maternal benefits of prenatal exercise with pregnant women, such as the impact of exercise on the type of delivery and length of labor, lowering blood glucose, and reducing risk factors for chronic diseases. For example, one of our participants discussed the

maternal benefits of exercise, especially when it is combined with a proper diet: “I discuss the importance of proper weight gain, increased mood, possible quicker labor and decreased risk for gestational diabetes when combined with a healthy diet” (HCP 18). Although one provider suggested discussing the fetal and newborn benefits of exercising at counseling sessions, only a few providers highlighted the fetal benefits of maternal exercise in their sessions.

Safety Concerns of Pregnant Women

According to nurse practitioners and midwives, many women are worried about the safety of exercising during pregnancy. Women inquired about the safety limits of exercising during pregnancy, such as recommended intensity, duration, safe types of exercise, and lifting recommendations. Some women also wanted to continue their prepregnancy exercise routines during pregnancy and sought advice from their providers on the safety of continuing their prepregnancy exercise (i.e., “They usually ask about specific exercises, if swimming is ok or if they can continue running, etc.”).

Barriers to Counseling

Only a few nurse practitioners and midwives were satisfied with the outcomes of their counseling efforts. In contrast, the majority gave up counseling due to the ambiguity of the efficacy of counseling, which is the primary barrier to exercise counseling in our sample. For example, one of our participants mentioned, “I think they are tired and do not have the energy to put forth the effort to exercise” (HCP 16). Many nurse practitioners and midwives in our sample followed a reactive approach to exercise counseling that provided exercise advice only if pregnant women asked questions about exercising during pregnancy or if pregnant women were at high risk for hypokinetic diseases. This practice was clearly reflected by a quote from one of our participants: “I typically talk to patients who bring up the topic and I discuss it with our diabetic pts [patients] to help lower their blood glucose levels” (HCP 18). Time constraints during prenatal appointments were not a significant barrier to providing exercise counseling, as only two providers expressed concerns about time limitations for counseling.

Suggestions for Improvement

To enhance their counseling efforts, many providers recommended reiterating physical activity guidelines and the benefits, particularly the fetal benefits of exercising at each stage of pregnancy, to all pregnant women, not just those with hypokinetic diseases (i.e., “I could discuss it with every patient”). Although only a few nurse practitioners and midwives emphasized the need for further education regarding exercising during pregnancy, a considerable proportion noted the need for handy tools to aid exercise counseling.

Providers expect such tools to include links to safe aerobic, yoga, and strength exercises tailored to pregnant and postpartum women. Such tools should also provide information about movements to avoid during pregnancy, safety tips, and contraindications to exercise during pregnancy.

Discussion

Despite limited resources and time constraints in busy maternal clinics, midwives and nurse practitioners in our sample appear to provide sufficient information about physical activity guidelines to pregnant women. Most of the providers' advice regarding physical activity guidelines at least included information about frequency and intensity, whereas some even suggested safe types of exercise during pregnancy. In previous studies (Nelson et al., 2022; Stengel et al., 2012), many pregnant women were not provided with sufficient information about physical activity guidelines during pregnancy; especially since they had not received information about frequency and intensity of exercise, pregnant women had difficulties comprehending and practically following exercise advice during pregnancy (Stengel et al., 2012). However, one of the above studies was conducted among women after childbirth and asked for their perceptions of the obstetric providers' advice regarding exercising during pregnancy; thus, their responses are susceptible to recall bias (Stengel et al., 2012). The second study was conducted among obstetric physicians (Nelson et al., 2022), who usually focus more on clinical aspects of pregnancy than lifestyle counseling (McGee et al., 2018), compared to midwives and nurse practitioners who are also trained, have more experience, and could spend more time in lifestyle counseling (Bauer et al., 2010; Stotland et al., 2010; Yankou et al., 1993). Per the latest ACOG recommendations (American College of Obstetricians and Gynecologists, 2020), a considerable proportion of nurse practitioners and midwives in our sample advised pregnant women to be involved in at least 150 min of physical activity a week or 30 min on most days. In addition to discussing the guidelines, providers are encouraged to highlight that the 30-min per day target can be reached by engaging in short exercise bouts (e.g., 3 bouts of 10 min). Similarly, it is crucial to emphasize that any physical activity, including activities of daily living, not just structured exercise, contributes to the 150-min target and offers significant health benefits (Bull et al., 2020). Midwives and nurse practitioners in our study encouraged nonexercisers to start exercising during pregnancy, at least with low-intensity activities such as walking or yoga, which was rarely observed in previous similar studies (Entin & Munhall, 2006; Hopkinson et al., 2018), but in line with the latest ACOG recommendations (American College of Obstetricians and Gynecologists, 2020). In a previous similar study, where the sample also included pregnant women, although providers said similar things regarding their exercise counseling, the pregnant women did not

"agree" and reported that these conversations are not happening in clinical settings (Blankenship et al., 2020). However, this study was conducted by recruiting five obstetric physicians and one advanced practice registered nurse without midwives in the sample (Blankenship et al., 2020), which may not reflect midwives' and nurse practitioners' practice in Kentucky.

Similar to previous studies among obstetric providers in the United States (Bauer et al., 2010; Entin & Munhall, 2006), yet discordant to the latest guidelines (American College of Obstetricians and Gynecologists, 2020), many midwives and nurse practitioners in our sample referred to heart rate to monitor exercise intensity, whereas ACOG recommends the "talk test" because heart rate becomes less sharp due to cardiodynamic changes in pregnancy (American College of Obstetricians and Gynecologists, 2020; McMurray et al., 1993). Conforming with other studies (Evenson & Pompeii, 2010; Hopkinson et al., 2018), many nurse practitioners and midwives in our sample encouraged pregnant women to continue their prepregnancy exercise routines yet listen to their bodies and discouraged vigorous exercise without sufficient empirical evidence (Beetham et al., 2019). Obstetric providers in previous studies (Hopkinson et al., 2018) and providers in our sample advised pregnant women to slow down as the pregnancy progresses, which is discordant with ACOG's latest guidelines that recommend continuing exercise until childbirth, as pregnant women tolerate (American College of Obstetricians and Gynecologists, 2020). Like many other studies in the literature (Blankenship et al., 2020; Stotland et al., 2010), nurse practitioners and midwives in our sample also demonstrated a reactive approach to exercise counseling, emphasizing the need to empower pregnant women to ask questions from their providers regarding exercising during pregnancy. In line with prior evidence (Chang et al., 2013; Stotland et al., 2010), midwives and nurse practitioners in our sample also believed that their counseling had little or no impact on changing the exercise behavior of pregnant women, which stressed the need to demonstrate providers' role in promoting exercise during pregnancy.

Studies have claimed that obstetric providers do not spend sufficient time on lifestyle counseling and provide inappropriate advice to pregnant women regarding exercising during pregnancy (Evins et al., 2021; Lindsay et al., 2017; Okafor & Goon, 2021). However, our study found that many midwives and nurse practitioners give appropriate advice regarding maternal exercise with only minor issues and spend sufficient time on exercise counseling at maternal clinics. The study emphasized the necessity of investigating whether pregnant women are implementing the exercise advice they received from obstetric providers in their day-to-day lives. Midwives and nurse practitioners in our study also emphasized the necessity of having tools to offer safe exercise options during pregnancy.

Our findings show that even among practitioners who value and discuss exercising during pregnancy with pregnant women, there is a lack of specific resources for exercise

prescriptions given to pregnant women. Previous work from the pregnant women's perspective suggests that even with provider support for exercise, there is a clear lack of specific coaching on which exercises to do, how much to do, and how to do them correctly (Blankenship et al., 2020), and often the result is the pregnant woman not being sufficiently active. Thus, additional resources are needed to help providers give pregnant women safe, effective, and appropriate exercise guidance for each stage of pregnancy and postpartum.

Strengths and Limitations

Although the study has numerous strengths, it also has a few limitations that are worth considering when interpreting the findings. Unlike in-person interviews or focus groups, online surveys may not capture in-depth qualitative information such as facial expressions (Terry & Braun, 2017). Despite our efforts to reach potential participants through different channels, only a few providers responded to our survey. This led to a biased sample, suggesting that midwives and nurse practitioners offering better exercise counseling to pregnant women are more likely to respond to requests to participate in the study. However, the potential limitations of the open-ended survey used in this study are outweighed by the less social desirability bias of responses due to high anonymity and the ability to capture perceptions of geographically spread participants (Terry & Braun, 2017).

Implications for Practice

Our study is one of the few that explored the content and quality of exercise advice provided to pregnant women by midwives and nurse practitioners in the Southern United States. Our findings revealed that the majority of midwives and nurse practitioners in our sample committed to providing comprehensive and reliable exercise counseling with sufficient information about physical activity guidelines. This highlights the role of midwives and nurse practitioners in promoting exercise during pregnancy and reinforces the importance of having a midwife or nurse practitioner competent in lifestyle counseling in the obstetric team. Moreover, the study findings help to identify weak areas in lifestyle counseling and to design midwifery and obstetric training programs that address current public health needs, extending beyond just obstetrics. Healthcare administrators can utilize our findings to identify barriers to exercise counseling in maternal clinics and formulate effective policies to mitigate those barriers. The findings also provided evidence to expand the role of midwives and nurse practitioners beyond helping childbirth and to create a physically active nation.

Conclusions

This study revealed that midwives and nurse practitioners in our sample have dedicated time to providing exercise

counseling. They also give pregnant women comprehensive and accurate information about physical activity guidelines, including details on frequency and intensity, along with examples of safe exercises for pregnant women. However, midwives and nurse practitioners should be encouraged to start exercise counseling proactively and train more on how to continue exercising throughout pregnancy, maintaining a sufficient intensity rather than advising to slow down as the pregnancy progresses. Midwives and nurse practitioners should encourage pregnant women to safely continue vigorous exercise during pregnancy, if they were doing vigorous exercise before pregnancy, and use the "talk test" to monitor exercise intensity. We recommend that midwives and nurse practitioners emphasize the safety of exercising during pregnancy and the fetal and newborn benefits of exercise in their lifestyle counseling sessions.

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Author Contributions

Conceptualization: MP, TSN, MMB, DVT, MS, DP, and RAT; methodology: MP, TSN, MMB, DVT, and RAT; validation: MP, TSN, MMB, and RAT; formal analysis: MP, DP, and JMC; investigation: MP, TSN, MMB, DVT, DP, and RAT; data curation: MP and DP; writing—original draft preparation: MP and DP; writing—review and editing: MP, TSN, MMB, JMC, DVT, DP, MS, and RAT; supervision: DVT, MS, and RAT; project administration: MP and DP; funding acquisition: MP and RAT. All authors have read and agreed to the published version of the manuscript.

Data Availability

The original contributions presented in the study are included in the article; further inquiries can be directed to the corresponding author.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Western Kentucky University on 15 February 2024 (IRB# 24-192).

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Supplemental Material

Supplemental material for this paper is available online.

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