

VIEWPOINT

Exercise During Pregnancy

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Historically, pregnant women were advised to refrain from exercise because of concerns about fetal risk. Simultaneously, they were advised to increase their caloric intake during pregnancy. However (in part because of these misguided recommendations), some of the weight gained during pregnancy was usually retained. Elevated maternal weight is associated with a higher birth weight of offspring and contributes to the intergenerational transmission of obesity.¹ Consequently, pregnancy has evolved as a major contributor to the worldwide obesity epidemic and multiple related maternal and fetal comorbidities, some of which have potential lifelong consequences.

The American Congress of Obstetricians and Gynecologists (ACOG) recognized that sedentary lifestyle is a major health risk for women and published its first guidelines for exercise during pregnancy in 1985, with the latest update published in 2015.² Yet few pregnant women achieve an appropriate level of exercise in part because they are uncertain about the types and amount of exercise that can and should be performed. This Viewpoint summarizes suggestions from current guidelines for exercise during pregnancy.

Safety of Exercise in Pregnancy

Clinicians have traditionally been concerned about the possibility of exercise-induced risk of preterm delivery or fetal stress. However, a recent meta-analysis that included 2059 women showed that among normal-weight women with singleton uncomplicated pregnancies, aerobic (stationary cycling, water aerobics, aerobic dance) and strength or toning exercise of moderate intensity (60%-80% of maximum age-predicted heart rate [HR_{max} , 220 minus age in years]) performed 3 to 4 days per week (35-90 min/session; mean, \approx 60 min) starting late in the first trimester (weeks 8-13 in 5 of 9 randomized clinical trials [RCTs]) or during the second trimester (weeks 16-22 in 4 of 9 RCTs) and lasting until the end of pregnancy was not associated with an increased risk for preterm birth (ie, <37 weeks) or low birth weight.³

Another question is whether it is safe for previously sedentary women to begin exercise during pregnancy. Contrary to previous opinions, pregnancy is now considered an ideal time not only for continuing but also for initiating an active lifestyle. Evidence from a recent RCT of 634 previously sedentary women suggests that a combination of aerobic dance and strength exercise of moderate intensity (<70% of HR_{max} [3 d/wk at 50-55 min/session], weeks 9-11 until the end of pregnancy) does not compromise maternal or fetal well-being as assessed by mean gestational age, type of delivery, incidence of preterm delivery, birth weight, neonatal head circumference, Apgar score, and pH level of umbilical cord blood.⁴

Exercise is also considered safe for women with risk factors such as chronic hypertension, gestational dia-

betes, or overweight/obesity. A meta-analysis of 722 women with at least 1 of these conditions showed that aerobic exercise (walking, stationary cycling, aerobic dance, water gymnastics) at moderate intensity (\leq 70% of heart rate reserve [HR_{max} minus resting heart rate]) and strength exercise was safe for the fetus.⁵

Benefits of Exercise During Pregnancy

According to a 2009 report from the Institute of Medicine,⁶ excessive gestational weight gain is prevalent among all weight categories: 19.5% of underweight women (18-kg gain), 38.4% of normal-weight women (16-kg gain), 63.0% of overweight women (11.5-kg gain), and 46.3% of obese women (9-kg gain). A major benefit of exercise during pregnancy is the prevention of excessive gestational weight gain. A meta-analysis of 24 RCTs (7096 participants) found high-quality evidence that compared with standard care with no exercise, moderate aerobic exercise (walking, dance, aerobics) with or without diet was associated with a significant relative reduction in the risk of excessive gestational weight gain (mean risk ratio, 0.80 [95% CI, 0.73-0.87]).⁷ Exercise during pregnancy also has been linked to decreased risk of the following: macrosomia in newborns, gestational diabetes, preeclampsia, cesarean delivery, low back pain, pelvic girdle pain (ie, pain between the posterior iliac crest and the gluteal fold, sometimes also in the pubic symphysis), and urinary incontinence.^{3,8}

Exercise During Pregnancy: When and How?

According to the latest ACOG guidelines,² all pregnant women without obstetric and medical contraindications should be encouraged to follow the same exercise guidelines as adults who are not pregnant; that is, engage in aerobic and strength exercise at moderate intensity at least 20 to 30 minutes per day on most days of the week (Table). Most high-quality studies have used aerobic exercises or strength exercises with interventions beginning after the first prenatal visit (weeks 9-12) and lasting until near term (weeks 38-39). Clinical trials failed to demonstrate the benefits of yoga and pilates, which are often recommended by clinicians for pregnant women. However, yoga is thought to be effective for improving mental health and reducing pain.

The intensity of each exercise session should be individualized and can be monitored by using the Borg rating of perceived exertion (RPE) scale (minimum score, 6 [very, very light exertion]; maximum, 20 [very, very hard exertion]). According to ACOG guidelines, pregnant women should exercise at a moderate intensity (RPE score, 13-14 [somewhat hard]).² A more practical method also recommended by ACOG to monitor exercise intensity is the talk test—as long as an individual can carry on a conversation while exercising,

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Table. Exercise Recommendations and Precautions for Pregnant Women^a

Type of Program	Duration, Frequency ^b	Optimal Intensity	To Be Avoided
Low-impact aerobic exercise Walking, aerobic dancing, stationary cycling, jogging (in previously active women), or swimming	20-30 min, 3-5 d/wk	Moderate as ideally controlled via heart rate ($\leq 80\%$ HR _{max}), rate of perceived exertion (ie, 13-14 on the Borg scale ^c), or the more practical talk test	High-intensity ($>90\%$ HR _{max}) strenuous exercise; long-distance running; exercises with risk of falls or impact of the body against the ground or hard surfaces (jumping or quick changes of direction), or physiological danger (eg, diving)
Strength exercise (toning) Resistance bands, dumbbells, body weight exercises involving large muscles	15-20 min, 3-5 d/wk	Light to moderate loads (eg, 1-2 sets of 10-15 repetitions using 1- to 3-kg dumbbells)	Isometric exercises, Valsalva maneuver, frequent heavy weight lifting, hot yoga or pilates, supine position exercises
Pelvic floor muscle training (Kegel)	10-15 min, 3-5 d/wk	≈ 100 Repetitions	
Combination of the low-impact aerobic and strength exercises (highly recommended) Low-impact aerobic and strength exercises combined (eg, aerobic dancing followed by use of dumbbells)	45-65 min, 3-4 d/wk	Same as for low-impact aerobic and strength exercises	Same as for low-impact aerobic and strength exercises

Abbreviation: HR_{max}, age-predicted maximum heart rate (= 220 minus age).
^a Duration of exercise over pregnancy indicates the end of the first trimester (≈ wk 12) to end of pregnancy (wk 38-39) for all programs.
^b Each session must include an initial warm-up and a final cool down period (≈ 5 min each).
^c The Borg scale quantifies ratings of perceived exertion from a minimum score of 6 (very, very light) to a maximum of 20 (very, very hard), with a score of 13 to 14 denoting moderate intensity (ie, somewhat hard).

she usually will not be overexerting.² Conversely, bed rest is still prescribed for certain conditions in pregnancy despite limited evidence for therapeutic efficacy.

Precautions and Contraindications

Women should exercise in a comfortable environment, maintain hydration, prevent exposure to humidity and heat conditions, and prevent fasting or hypoglycemia. Exercise should be discontinued if a pregnant woman experiences any warning signs or symptoms (vaginal bleeding, regular or painful contractions, amniotic fluid leakage, dyspnea before exertion, dizziness, headache, chest pain, muscle weakness affecting balance, calf pain, or swelling).² Strenuous aerobic exercise of greater than 90% of HR_{max} is discouraged because this level of activity might potentially increase the risk for hyperthermia or dehydration and also divert a considerable amount of blood flow to the working muscles and thus affect placental perfusion, thereby compromising fetal well-being. Long-distance running and frequent heavy weight lifting (or intense isometric exercises) should also be discouraged. The latter activity often involves repeated bouts of the Valsalva maneuver, with the potential risk of reducing placental blood flow and fetal heart rate (via an increase in arterial and intra-abdominal pressure); it could

also harm the pelvic floor (increasing the risk of urinary and anal incontinence or pelvic organ prolapse). Exercises performed in the supine position from the second trimester to delivery should also be avoided. The supine position can provoke aortocaval compression, which in turn causes hypotension and reduces cardiac output, thereby potentially reducing blood supply to the fetus.

Absolute contraindications for any type of exercise other than ambulation include hemodynamically significant heart disease, restrictive lung disease, incompetent cervix, persistent second- and third-trimester bleeding, placenta previa after 26 weeks, risk of ruptured membranes (which is associated with onset of uterine contractions and multiple gestation at risk of preterm birth), preeclampsia or pregnancy-induced hypertension, or severe anemia.² ACOG guidelines recommend that patients with these conditions should be allowed ambulation to help prevent venous thromboembolism, which is more common during pregnancy.²

Conclusions

Pregnancy is no longer considered a state of confinement; an active lifestyle during pregnancy is safe and beneficial. Most medical and scientific organizations promote physical activity in all phases of life, including pregnancy.

ARTICLE INFORMATION

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