

Risk assessment for physical activity and exercise clearance

In pregnant women without contraindications

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Traditionally, exercise was advised with caution or not recommended for pregnant women. Women active before pregnancy were advised by physicians to reduce their habitual exercise levels, while previously inactive women were advised to refrain from initiating exercise programs.¹ However, guidelines for exercise during pregnancy have evolved substantially during the past 30 years; recommendations have become less restrictive as evidence-based information becomes more readily available.² Moreover, an increasing number of pregnant women wish to maintain prepregnancy physical fitness levels during the prenatal period, and others wish to initiate exercise for healthier pregnancies.^{2,3}

The conservative nature of medical advice in the past was intended to safeguard the health of both the mother and the growing fetus.^{2,3} Advice was intentionally conservative because of concern that exercise might shift oxygenated blood and energy substrates away from the fetus to maternal skeletal muscle, as well as increase core body temperature during vulnerable developmental periods such as embryogenesis. Therefore, it was largely unknown whether exercise increased the risk of congenital abnormalities and caused disturbances in optimal fetal growth.² There were also maternal concerns that excessive exercise might cause conditions such as chronic fatigue and hypoglycemia, or increase the risk of injury (eg, low back pain, musculoskeletal injury).^{4,5} A more contemporary view of exercise during pregnancy emphasizes that women and their care providers need to consider the risks of not participating in regular physical activities during the prenatal period.³

Previous work in prenatal exercise did not systematically evaluate the prevalence of adverse exercise-related events. This article provides an executive summary of findings from a systematic review of the risks of physical activity for pregnant women without contraindications.⁶ It is one in a comprehensive series about the risks of physical activity participation in patients with various medical conditions.⁷ The overall purpose of these systematic reviews was to provide evidence-based recommendations for tools to simplify exercise clearance and prescription: the new Physical Activity Readiness Questionnaire for Everyone (PAR-Q+)⁸ and the electronic Physical Activity Readiness Medical Examination (ePARmed-X+).⁹ The

purpose of this summary is to present evidence-based information regarding adverse exercise-related events during uncomplicated pregnancy and discuss this information in relation to the family physician's task of screening patients for physical activity participation.

Discussion

A systematic and rigorous examination of the literature published between 1982 and 2009 showed that pregnant women without contraindications were at low risk of adverse events during exercise irrespective of physical activity and fitness level before pregnancy. A total of 49655 hours of exercise were examined to determine the risk of adverse events, identifying the prevalence of both major and minor maternal events, as well as any exercise-related fetal events. Based on the available evidence, the major adverse event rate was calculated to be 1.4 per 10000 hours of exercise. When including minor events and exercise-related fetal events, the adverse event rate increased to an overall rate of 6.8 per 10000 hours of exercise.

It is important to note that both calculations are likely conservative. A major event was generally determined from the reporting of reasons for participant dropout; therefore, it is unknown whether a major adverse event was specifically exercise related. Only 1 major adverse event was reported directly following exercise (ie, uterine contractions requiring 72 hours of medical observation). Examples of minor adverse events reported during or following exercise were leg cramps, nausea, and fatigue. We have purposely erred on the side of caution; however, these events could potentially be classified as common "discomforts" of exercise rather than true adverse events. Although rare, the most frequently reported exercise-related adverse event was fetal bradycardia. In all instances, the event was reported as transient, and fetal heart rate returned to normal following exercise cessation.

Rates of adverse events must be interpreted in the context of general prescreening for absolute and relative contraindications to exercise, as well as qualified exercise professionals in the environment. The above

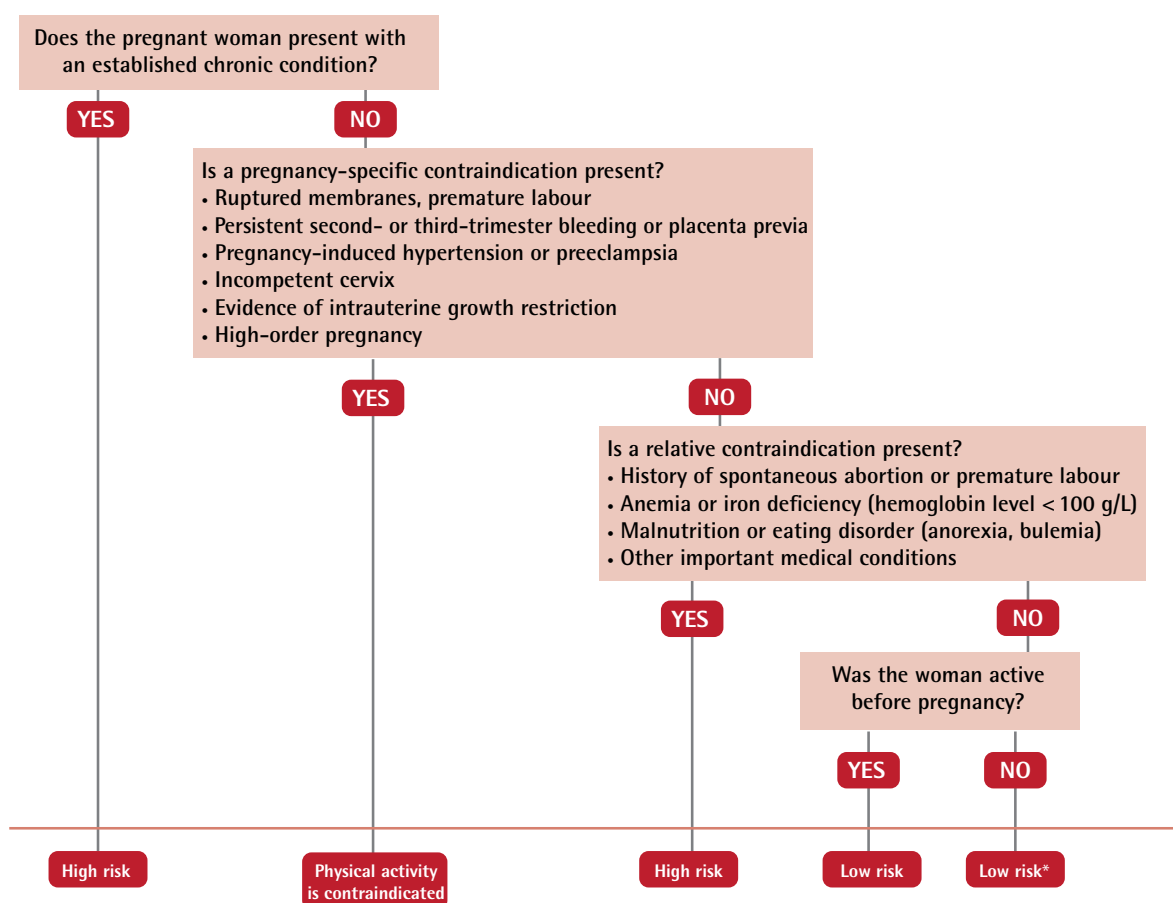
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rates are based on women presenting without contraindications and, accordingly, screening procedures to exclude at-risk pregnant women from participation were administered in most exercise studies reviewed (eg, completion of the Physical Activity Readiness Medical Examination for Pregnancy). Many investigations also evaluated exercise in pregnant women under the supervision of qualified exercise professionals. We contend that prescreening and the supervisory role of qualified exercise professionals contributed to the low incidence of adverse exercise-related events. The role of the qualified exercise professional might be especially important for previously inactive pregnant women when initiating exercise programs.

Although there was high variability in exercise prescription, the most common exercise prescriptions were exercise intensity of 50% to 70% of maximum, frequency of 3 times per week, exercise sessions of at least 30 minutes per day, and programs lasting between 12 and 24 weeks. Risk of an adverse event was low across trimesters and across a variety of types of exercise (eg, stationary cycling, walking, water-based activities like swimming). **Table 1** presents specific recommendations concerning the risk of adverse events during exercise in pregnant women presenting without contraindications. A decision tree for physical activity screening and general risk classification is presented in **Figure 1**.

Figure 1. Clinical decision tree for assessing the risk of adverse events during physical activity in pregnant women: *This decision tree can be used to categorize a pregnant woman as high or low risk, thereby informing requirements for the prescription of physical activity and the monitoring of exercise programs.*



*Despite being at low risk, pregnant women who were not previously active might wish to consult qualified exercise professionals for advice on preferred activities.

Table 1. Evidence-based recommendations for consideration in physical activity screening in pregnant women without contraindications

RECOMMENDATION	LEVEL*	GRADE†
There is no evidence that previously inactive or active women (without contraindications) are at risk of adverse fetal events if they participate in routine physical activity throughout pregnancy. Pregnant women without contraindications should be encouraged to partake in a variety of moderate-intensity physical activities (eg, walking, stationary cycling, swimming)	III	B
Pregnant women without contraindications (who were previously active or inactive before pregnancy) are at low risk of adverse maternal events if they participate in routine moderate-intensity physical activities (eg, walking, stationary cycling, swimming). Pregnant women should be encouraged to partake in routine physical activity	II	B
Healthy women with uncomplicated pregnancies can be stratified as low risk irrespective of activity level before pregnancy. Further systematic evaluation is required to determine the risk of adverse exercise-related events in pregnant women presenting with pre-existing medical conditions or contraindications to exercise	III	A

*Level I evidence includes randomized controlled trials; level II evidence includes randomized controlled trials with important limitations or observational trials with overwhelming evidence; level III evidence includes observational trials; and level IV evidence includes anecdotal evidence or expert opinion.

†Grade A recommendations are strong; grade B recommendations are intermediate; and grade C recommendations are weak.

Conclusion

Healthy pregnant women with uncomplicated singleton pregnancies are at low risk of adverse maternal or fetal exercise-related events when participating in moderate-intensity activities. Moreover, inactivity before pregnancy should not be a barrier to exercise participation when women are stratified as low risk. Before continuing physical activity or initiating an activity program, it is critical that prescreening occurs in pregnancy to control risk for adverse events and to safeguard the well-being of mother and child. Although the evidence supports regular physical activity during pregnancy at a moderate intensity using a variety of exercises, pregnant women are always advised to participate in activities that minimize the risk of balance loss and joint and ligament trauma to the body, as well as to avoid activities that could cause trauma to the fetus.³ The provision of evidence-based physical activity information and the development of exercise prescriptions for pregnancy can also be facilitated via collaboration with qualified exercise professionals. The next step in this process is to systematically examine the available literature to determine the risk of exercise-related adverse events in women stratified as high risk in the screening process.

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Competing interests

None declared

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