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THE IMPACT OF PHYSICAL ACTIVITY ON THE HEALTH OF PREGNANT WOMEN AND FETAL AND NEONATAL DEVELOPMENT - A LITERATURE REVIEW

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ABSTRACT

Introduction: Physical activity during pregnancy is attracting increasing interest among women, doctors and researchers. In recent years, there has been a growing body of research highlighting the positive effects of physical activity during this period. Contrary to earlier beliefs, physical activity is not only safe, but also recommended. The aim of this review is to analyse the current scientific evidence on the safety and benefits of exercise during pregnancy and to provide recommendations on the type and intensity of activity.
Methods: A comprehensive search of the scientific literature was conducted using PubMed and Google Scholar, taking into account publications published since 2017. Keywords included: "physical activity", "pregnancy", "healthy pregnant woman", "exercise" and "pregnant exercises".
Conclusions: A review of the scientific literature from the last eight years shows that regular, moderate physical activity has a number of health benefits for mother and baby, provided there are no medical contraindications. Promoting individualized, supervised exercise and education for both expectant mothers and healthcare providers should be a key element of prenatal care.

KEYWORDS

Physical Activity, Pregnancy, Healthy Pregnant Woman, Exercise, Pregnant Exercises

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Introduction

Pregnancy is a unique period in a woman's life during which significant physiological, hormonal and psychological changes occur. During this stage of life, women are highly motivated to change their habits for the better, including the implementation of physical activity, out of concern for their health and that of the fetus (Lindqvist et al., 2017). In the past, it was recommended to limit physical activity during pregnancy, but modern research clearly indicates that movement can play a key role in maintaining the health of the mother-to-be and the proper development of the fetus. Recommendations from institutions such as the American College of Obstetricians and Gynecologists (ACOG) and the World Health Organisation (WHO) confirm that moderate physical activity during pregnancy is not only safe but also beneficial ("Physical Activity and Exercise During Pregnancy and the Postpartum Period," 2020; Bull et al., 2020; Cai & Davenport, 2022). With the increasing number of pregnancies complicated by gestational diabetes, hypertension, depression or obesity, physical activity is becoming one of the key elements for prevention and support of treatment (Davenport et al., 2018; Cai et al., 2022). In recent years, there have also been reports of the positive effects of physical activity on the length and course of labour, including reduced need for assisted vaginal delivery (e.g., forceps or vacuum extraction) (Corrigan et al., 2022; Davenport, Ruchat, Sobierajski, et al., 2018). There are an increasing number of recommendations and educational campaigns promoting exercise during pregnancy as an integral part of a healthy lifestyle for the mother-to-be ("Physical Activity and Exercise During Pregnancy and the Postpartum Period," 2020; Bull et al., 2020). In addition, practising sport improves the well-being of pregnant women, the quality of their sleep and facilitates recovery after childbirth (Dipietro et al., 2019). The aim of this literature review is to comprehensively analyse current research on the effects of exercise on pregnancy and maternal and child health.

Current recommendations

In recent years, recommendations for physical activity in pregnancy have been updated to better meet the health needs of pregnant women and to take into account new scientific evidence. The American College of Obstetricians and Gynaecologists reaffirmed in 2020 that pregnant women without contraindications should perform a minimum of 150 minutes of moderate aerobic activity per week, spread over several days. They are advised to avoid activities that carry a risk of injury, falls or severe overload ("Physical Activity and Exercise During Pregnancy and the Postpartum Period," 2020). The World Health Organisation, on the other hand, published new physical activity guidelines in 2020, which for the first time so clearly emphasise the importance of exercise also during pregnancy. The WHO recommends at least 150 minutes of moderate aerobic activity per week, supplemented by muscle-strengthening exercises at least twice a week. The new guidelines also take into account the need to reduce time spent sitting and encourage daily exercise adapted to the individual capabilities of the pregnant woman (Bull et al., 2020). The changes in the recommendations concern not only the volume of activity, but also the quality - there is greater emphasis on regularity, variety of forms of activity, and the need to educate pregnant women about exercise safety. There are also specific guidelines for women who are obese, have twin pregnancies or have chronic conditions, which were previously often excluded from the recommendations. According to the Polish Society of Gynaecologists and Obstetricians, physical activity during pregnancy has numerous benefits for both the mother-to-be and the developing baby. If there are no medical or obstetric contraindications, regular exercise during pregnancy is safe and even recommended (Kwiatkowska et al., 2023).

If a woman has not been physically active before pregnancy, the start of exercise should be done gradually and with caution. It is best to start with low-impact forms of exercise, such as leisurely walks or swimming. Initially, activity can be of short duration - for example, about 15 minutes - and then gradually increased. Ultimately, a pregnant woman should aim to do at least 150 minutes of moderate physical activity per week, according to current recommendations (Mottola et al., 2018).

According to experts from the World Health Organisation and the American College of Obstetricians and Gynaecologists, women who were physically active or regularly engaged in more intensive forms of exercise prior to pregnancy can also continue to be physically active during pregnancy - as long as the pregnancy progresses without complications and there are no distressing symptoms or feelings of discomfort during exercise (Bull et al., 2020; Mottola et al., 2018).

Benefits of physical activity during pregnancy

Regular physical activity during pregnancy is now seen as an important part of preventive health care, benefiting both the health of the mother and the developing fetus. Numerous studies confirm that moderate, appropriately adapted physical activity has a range of psychological, metabolic and somatic benefits (Cai et al., 2022; Dipietro et al., 2019; Sánchez-Polán et al., 2023).

One of the key areas affected by physical activity is mental health. Women who are physically active during pregnancy have been shown to have lower levels of depressive symptoms and prenatal anxiety compared to women who do not engage in physical activity. Regular exercise has an antidepressant and mood-stabilising effect, which helps mothers-to-be better cope with the emotional challenges of pregnancy (Sánchez-Polán et al., 2023; Poyatos-León et al., 2017).

Another important benefit is the reduction of the risk of excessive weight gain and gestational diabetes. Physical activity during pregnancy can reduce the risk of developing gestational diabetes by up to 38% (Rute-Larrieta et al., 2024). These findings were also confirmed in a study involving 456 pregnant women. It found that participation in regular, supervised physical activity - consisting of a warm-up, moderate-intensity aerobic exercise and resistance training - was associated with a statistically significant reduction in mean weight gain and a lower risk of developing gestational diabetes (Barakat et al., 2018). Physical activity also improves gestational diabetes control. The results of numerous studies confirm the effectiveness of physical activity in controlling glycaemia in women with gestational diabetes. Both aerobic and resistance training contribute to lowering mean blood glucose concentrations at fasting and two hours after a meal. At the same time, resistance exercise has been shown to be more effective in reducing postprandial glycaemia (Xie et al., 2022). Other studies have also shown a positive effect of resistance exercise on blood pressure control (Huifen et al., 2022). These results are consistent with the meta-analysis by Corso and colleagues. Both aerobic and resistance exercise are effective and safe strategies to support the maintenance of normal blood pressure in pregnant women (Corso et al., 2022). Prevention of pre-eclampsia is also an important area of impact of physical activity.

Women who undertake regular exercise have a lower risk of developing pre-eclampsia, which can affect pregnancy and perinatal outcomes (Davenport et al., 2018).

The beneficial effects of exercise are also seen in terms of improved sleep quality. Regular activity can help regulate the diurnal rhythm and improve the quality of nocturnal sleep, which is particularly important in the context of physiological changes and the body's increased need for recovery during pregnancy. However, it should be noted that regular physical activity did not significantly translate into improvements in insomnia in pregnant women (Yang et al., 2020).

Effects of activity on fetal and neonatal development

A growing body of scientific evidence suggests that physical activity in pregnant women can have a positive impact not only on maternal health, but also on fetal development and child health in the postnatal period. Regular physical exercise can have a beneficial effect on neonatal body composition and metabolic parameters after birth, reducing the risk of metabolic disorders in the offspring (Menke et al., 2022; Moreno-Fernandez et al., 2020). It has also been shown that maternal physical activity can improve fetal cardiac adaptation to the external environment (Bauer et al., 2020) and reduce the risk of the neonate needing to be hospitalised in an intensive care unit (Lindberger et al., 2024).

Prenatal exercise may also have a beneficial effect on children's neurological and linguistic development - there has been an association between physical activity in pregnant women and better development of cognitive function and language abilities in children aged 18-60 months (Moreno-Fernandez et al., 2020). There are also indications that maternal physical activity may lead to improved learning and memory skills, as well as reduced anxiety behaviour in children (Guinhouya et al., 2022).

Furthermore, engaging in physical activity during pregnancy may have long-term effects on the child's physical activity levels, suggesting that physical activity may be programmed as early as fetal life (Guinhouya et al., 2022). One study also reported a potential association between pregnant women's physical activity and reduced incidence of childhood caries, although this effect was not statistically significant after adjusted analysis (Fôlha et al., 2025).

Safety of exercise

Physical activity during pregnancy, in the absence of medical or obstetric contraindications, is considered safe and beneficial for most pregnant women. As recommended by the American College of Obstetricians and Gynaecologists, pregnant women should be encouraged to continue or initiate safe forms of physical activity (“Physical Activity and Exercise During Pregnancy and the Postpartum Period,” 2020). It is crucial that the type and intensity of physical activity is individually tailored to the woman's health status, fitness level and the course of the pregnancy.

Walking, swimming, moderate-intensity aerobic and resistance exercise, and prenatal yoga are considered the most recommended forms of activity, provided they are appropriately supervised and modified according to the trimester of pregnancy (“Physical Activity and Exercise During Pregnancy and the Postpartum Period,” 2020).

The Polish Society of Gynaecologists and Obstetricians also emphasises that moderate physical activity promotes the normal course of pregnancy and can have a positive effect on the delivery itself. At least 150 minutes of physical activity per week, spread over a minimum of three days, is recommended (Kwiatkowska et al., 2023).

The safety of exercise during pregnancy has been confirmed in numerous studies and systematic reviews. Analyses by Zhang et al. and Cilar Budler et al. confirm that physical activity does not increase the risk of miscarriage, preterm birth or perinatal complications in women without contraindications (Zhang et al., 2023; Budler & Budler, 2022).

It is recommended that all women who are pregnant or planning a pregnancy should be informed by health care professionals about the benefits of regular physical activity. At the same time, professionals should be familiar with contraindications and symptoms that may require modification or cessation of exercise (Brown et al., 2022).

Contraindications to physical activity in pregnancy

Despite the numerous health benefits of physical activity in pregnancy, there are clinical situations in which its undertaking is contraindicated or requires special caution. Any woman planning physical activity should consult her health care provider, especially in high-risk pregnancies (Silva-Jose et al., 2023).

According to current recommendations, absolute contraindications to physical activity during pregnancy include: premature rupture of the membranes, preterm labour, unexplained and persistent bleeding from the genital tract, placenta previa after 28. week of gestation, pre-eclampsia, cervical insufficiency, intrauterine growth retardation (IUGR), high order multifetal pregnancy (e.g. triplets), uncontrolled type I diabetes, uncontrolled hypertension, untreated thyroid disease and other serious cardiovascular, respiratory or systemic conditions (Ribeiro et al., 2021).

Relative contraindications include recurrent miscarriages, history of preterm labour, twin pregnancies beyond 28 weeks, gestational hypertension, mild or moderate cardiovascular or respiratory disease, symptomatic anaemia, malnutrition, nutritional disorders and other significant disease entities requiring an individual approach (Ribeiro et al., 2021).

Physical activity should not be performed in the supine position after the first trimester of pregnancy, as compression of the aorta and inferior vena cava may occur, resulting in reduced uteroplacental flow and risk of fetal bradycardia (Guinhouya et al., 2022). In addition, pregnant women should ensure adequate hydration during exercise and avoid exercise in conditions of excessive overheating, especially in high humidity, exercise at high altitudes (if not there on a daily basis), contact sports, activities with risk of falls, injury or physical collisions (Bull et al., 2020).

Conclusions

Regular, moderate-intensity physical activity during pregnancy, in the absence of medical contraindications, is considered both safe and beneficial. The reviewed literature demonstrates that physical activity contributes significantly to the prevention of gestational diabetes, hypertensive disorders, perinatal depression, and preeclampsia. Moreover, it positively influences maternal psychological well-being, sleep quality, and postpartum recovery. The advantages also extend to fetal and neonatal outcomes. Maternal physical activity has been associated with improved fetal cardiovascular adaptation, enhanced metabolic health in newborns, and better neurodevelopmental outcomes. Furthermore, prenatal exercise may positively influence cognitive development and promote higher levels of physical activity in later stages of the child's life.

Given the wide-ranging benefits, it is essential to promote individualized, medically supervised physical activity among pregnant women. Education of both expectant mothers and healthcare professionals should form a key component of modern prenatal care strategies.

Disclosure:

Author Contributions:

The authors confirm contribution to the paper as follows:
Conceptualization: Aleksandra Sokół
Methodology: Aleksandra Sokół, Karolina Glajcar
Software: non applicable
Check: Remigiusz Flakus
Formal analysis: Aleksandra Sokół, Anna Kamieniak
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