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## **The impact of physical activity during pregnancy on labour and postpartum period - review**

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## **Abstract**

**Introduction and Aim:** Physical activity significantly impacts quality of life and is recommended at all ages, including time of pregnancy. This study examines the effects of physical activity during pregnancy on the peripartum period, including the risk of labor complications, duration of labor and delivery, the necessity for epidural analgesia, and the incidence of postpartum depression.

**Methods and Materials:** A literature review was conducted using the PubMed, Cochrane Library, and Google Scholar databases. The search included studies published between 2010 and 2025. The search strategy focused on identifying studies describing the effects of physical activity during pregnancy on peripartum outcomes. Keywords used in the search included: "physical activity," "labor and delivery," "exercise," "labor complications," "postnatal depression," and "epidural analgesia."

**Results and Conclusion:** No clear effect of physical activity during pregnancy on the risk of labor complications or the duration of labor was identified. Physical exercise during pregnancy does not reduce the need for epidural analgesia or the risk of postpartum depression. However, regular physical activity during pregnancy decreases the risk of obesity, pregnancy-induced hypertension, and gestational diabetes. Moderate-intensity of the physical activity should be recommended to all pregnant individuals, provided there are no contraindications.

**Keywords:** physical activity, labor and delivery complications, epidural analgesia, postnatal depression, exercise

## **Introduction**

Physical activity during pregnancy has been extensively associated with a reduced risk of gestational diabetes, pregnancy-induced hypertension, and subsequent obstetric complications, including preeclampsia, intrauterine fetal demise, placental abruption, and shoulder dystocia [1]. The protective effect is particularly evident among individuals with obesity, a population at increased risk for cesarean section and operative vaginal delivery [2,3]. In 2015, the American College of Obstetricians and Gynecologists (ACOG) updated its guidelines, recommending moderate-intensity physical activity three to five times per week for at least 30 minutes, alongside 20 minutes of vigorous-intensity activity [4,5]. Maternal exercise has further been associated with improved neonatal outcomes, including reduced low birth weight rates and enhanced oxygenation at birth [6]. Emerging evidence also suggests that prenatal physical activity may positively influence labor dynamics, shortening the active phase of labor and reducing reliance on epidural analgesia [7]. This study evaluates the impact of maternal physical activity on peripartum outcomes, focusing on the incidence of labor complications, labor duration, analgesic requirements, and labor-associated physical activity patterns conducive to favorable delivery outcomes.

## **Materials and Methods**

A systematic literature review was conducted using the PubMed, Cochrane Library, and Google Scholar databases. The search focused on studies published between 2010 and 2025. The strategy targeted research examining the effects of physical activity during pregnancy on peripartum outcomes. Keywords employed included: "physical activity," "labor and delivery," "exercise," and "labor complications." To ensure the quality of the included studies, publications were evaluated based on their relevance to the research topic and the robustness of their methodology.

## **Correlation Between Physical Activity and Peripartum Outcomes – The Impact of Exercise**

### **1. Peripartum Complications**

Regular physical activity during pregnancy demonstrates a significant correlation with a reduction in the need for medical interventions during the peripartum period, thereby potentially preventing the cascade of interventions frequently observed during labor [2,11]. This "domino effect" suggests that a single medical intervention may precipitate subsequent procedures, ultimately increasing the risk of complicated deliveries. One such intervention is labor induction, which has been correlated with a heightened risk of uterine rupture, the need for labor analgesia, adverse neonatal outcomes, prolonged hospitalization, and cesarean delivery [12]. A study conducted by Beckmann and Beckmann demonstrated that pregnant individuals who participated in a 12-week structured exercise program exhibited a lower incidence of labor induction with oxytocin compared to the control group [12]. Similarly, Uccella et al. (2019) reported a greater incidence of labor induction among individuals with moderate physical activity levels compared to those with high levels of activity (41.6% vs. 28.8%,  $p=0.004$ ) [5]. Further evidence highlights a strong interplay between maternal BMI and the frequency of obstetric interventions, including operative vaginal deliveries. In a retrospective population cohort study encompassing nearly 89,000 women, individuals with a BMI  $\geq 40$  kg/m<sup>2</sup> exhibited a 29% increased risk of failed labor induction compared to women with a normal BMI [13]. In the study by Haakstad and Bø (2011) [14], the cesarean delivery rate among exercising participants was 9.6%, compared to 22.6% in the control group ( $p=0.072$ ). Vaginal birth rates were significantly higher among the exercise cohort (85.7% vs. 62.3%,  $p=0.051$ ), with only a single case requiring operative vaginal delivery. Uccella et al. (2019) found no significant differences across the three groups (high, moderate, and no physical activity) with regard to blood loss and neonatal outcomes [5]. However, they reported a higher incidence of perineal trauma among nulliparous women engaging in pelvic floor muscle training compared to the broader population ( $p=0.03$ ). Szumilewicz et al. (2019) similarly demonstrated a favorable interrelation between maternal physical activity and a reduced frequency of operative deliveries (including both cesarean sections and instrumental vaginal births) [11]. In the study by Haakstad and Bø (2011) [14],

while the cesarean section rate was lower among women who exercised, the frequency of instrumental deliveries was slightly elevated (21.2% vs. 15.1%,  $p=0.419$ ). Moreover, the incidence of episiotomy was higher in the exercise group (36.5% vs. 30.2%,  $p=0.496$ ), though the postpartum hemorrhage rate was lower (9.6% vs. 18.9%,  $p=0.215$ ). Conversely, Watkins et al. (2021) observed comparable rates of operative delivery, perineal trauma, and postpartum hemorrhage in both active and non-active groups [7]. Similarly, Melzer et al. (2010) [15] reported no statistically significant differences regarding neonatal outcomes, epidural anesthesia usage, episiotomy rates, or perineal injuries.

## **2. Duration of Labor**

The impact of physical activity on the duration of labor has remained unclear over the years. A particular focus has been placed on the active phase of the first stage of labor and the second stage of labor. The second stage, characterized by fetal descent through the birth canal and the active pushing phase, demands significant physical effort from the laboring individual [7]. The findings of various studies on this matter remain divided. Some authors suggest that the active phase of labor is significantly shorter in pregnant individuals with higher physical activity levels compared to those who do not engage in exercise during pregnancy ( $5.77 \pm 4.97$  vs.  $7.43 \pm 6.29$  hours;  $P<0.01$ ) [7]. Moreover, extended duration of the first stage of labor is less common in active individuals (9.8% vs. 19.4%;  $P<0.01$ ; adjusted relative risk, 0.55; 95% confidence interval, 0.34–0.83) [7]. The duration of the second stage of labor appears to be similar across both groups [7,8]. Conversely, other studies failed to demonstrate any significant difference in the duration of the active phase of the first stage of labor or the second stage [9]. Among nulliparous women, the active phase of labor was shorter in the control group, consisting of individuals who did not engage in physical activity during pregnancy [9]. Haakstad & Bø (2020) [14] and Uccella et al. (2019) [5] found no significant difference in the duration of the active phase of labor between the exercising and non-exercising groups. However, in the subgroup of women who adhered strictly to exercise guidelines, the total duration of the active phase of labor was three hours shorter. In the study by Ghodsi et al. (2012), the second stage of labor was shortened by an average of 31 minutes in the physically active group [8]. Similar conclusions were drawn by Melzer et al. (2010), who found that the duration of the second stage of labor was shorter among women who exercised (88 vs. 146 minutes,  $p=0.051$ ) [15]. As noted by Salvesen et al. (2014), these results should be interpreted in light of the patients' BMI and ethnicity [9]. Barakat et al. (2016) [10]

observed that the combination of aerobic and resistance exercises appeared to have a more significant impact on labor duration.

### **3. Epidural Anesthesia**

Epidural anesthesia is considered the gold standard for labor pain relief, as recommended by the World Health Organization [16,17]. The frequency of epidural anesthesia usage varies from 10-64%, depending on the country, region, and hospital [16]. This method involves the placement of a catheter near the T10-L1 nerve roots and the administration of an anesthetic agent [16]. Despite its significant effect on reducing labor pain, epidural anesthesia can prolong the overall duration of labor and increase the risk of operative deliveries [18]. The impact of physical activity during pregnancy on the need for epidural anesthesia has been investigated in several studies, with conflicting results. Some authors have found no significant difference in the frequency of epidural use between physically active and inactive individuals during labor [5,15,19]. However, Haakstad & Bø (2020) demonstrated that women who exercised during pregnancy were more likely to receive epidural anesthesia (57.7% vs. 52.8%,  $p=0.615$ ) [14]. In contrast, Watkins et al. (2021) found that physically active women were less likely to use epidural anesthesia during labor (75.4% vs. 82.4%,  $p=0.04$ ) [7]. Uccella et al. (2019) observed that the use of epidural anesthesia was associated with a higher tendency for perineal trauma and the need for episiotomy [5].

### **4. Psychological Outcomes of Exercise During Pregnancy**

Depression during pregnancy and postpartum depression (PPD) represent significant challenges in perinatal care. Approximately 13-19% of women experience postpartum depression [20]. It has a far-reaching negative impact on the development of the mother-child bond as well as family dynamics. Physical activity during pregnancy is considered a potential preventive measure for depressive disorders in the perinatal and postpartum periods [22]. The risk of developing postpartum depression is 20 times higher in women with a prior history of mental health disorders [20]. Other contributing factors include stressful labor, cesarean section, preterm birth, gestational diabetes, and vitamin D deficiency [23]. The role of physical activity in preventing postpartum depression has been a subject of investigation, with promising results in some studies. Davenport et al. (2019) [24], in a study involving 639 women, found no significant difference in the incidence of postpartum depression between physically active women and those in the control group (3.7% vs. 4.1%). Similar conclusions

were drawn by Lewis et al. (2021) [20] and Flor-Aleman et al. (2022) [26]. In the study by Flor-Aleman et al. (2022), no positive or negative effect of exercise on postpartum depression was observed across all participants ( $p=0.409$ ). The study by Barakat et al. (2019) also found no significant impact of physical exercise on postpartum depression, with the incidence rates being 20% in the control group vs. 15.5% in the exercise group ( $p=0.836$ ).

## **5. Practical Recommendations for Physical Activity During Pregnancy**

The Canadian Guidelines for Physical Activity Throughout Pregnancy (2019) [28] state that all pregnant women, provided they have no medical contraindications, should engage in physical activity during pregnancy. The recommended duration of exercise is at least 150 minutes of moderate-intensity physical activity per week, spread over a minimum of three days per week [28]. Physical activity should focus on aerobic exercises, with elements of resistance training, and pelvic floor exercises should also be considered. Similar recommendations have been issued by the French National College of Midwives [29], suggesting that physical activity should exceed 150 minutes of moderate-intensity exercise per week, divided into at least three sessions of at least 30 minutes each. Recommended forms of exercise for pregnant women include swimming, water aerobics, yoga, dance, and stationary cycling. Activities that may compromise balance and increase the risk of falling, such as horseback riding, skiing, and contact sports, should be avoided [30]. Due to the lack of protective mechanisms against decompression, scuba diving is also not recommended [30]. Women experiencing nausea, dizziness, or discomfort should adapt exercises according to their condition, modifying them as needed to avoid upright positions, opting for seated or lying down exercises [28,29]. Pregnant women should avoid physical activity in high temperatures, including during fever and for 4-5 days after it subsides [29]. Hydration before, during, and after exercise is crucial. Absolute contraindications for physical activity during pregnancy include ruptured membranes, premature labor, placenta previa after 28 weeks of gestation, preeclampsia, unexplained vaginal bleeding, high-order multiple pregnancies, incompetent cervix, uncontrolled hypertension, type I diabetes and thyroid disorders, cardiovascular and other systemic diseases, intrauterine growth restriction, recurrent pregnancy loss, gestational hypertension, history of preterm birth, malnutrition, and eating disorders [28].

## **Conclusion**

Although physical activity positively impacts the health of pregnant women, this review



highlights the lack of conclusive evidence regarding its positive effect on reducing the incidence of perinatal complications. The duration of labor among women who engage in high, moderate, or no physical activity does not differ significantly. However, physical activity may contribute to reducing the frequency of labor induction and the cascade of medical interventions. Some authors suggest that physical activity may reduce the incidence of cesarean sections and operative vaginal deliveries.

No association was found between physical exercise and a reduced need for epidural anesthesia during labor. Additionally, no clear connection between physical activity during pregnancy and

a decreased incidence of postpartum depression was established. Nevertheless, physical exertion during pregnancy does help prevent excessive weight gain and the associated increase in the risk of hypertension and gestational diabetes. It is recommended that pregnant women engage in moderate physical activity for at least 150 minutes per week, divided into a minimum of three days per week. Exercises should focus on aerobic training, with elements of resistance exercise, while avoiding sports that may lead to injury. Future studies should further explore the impact of pelvic floor exercises on the duration of labor and the occurrence of related complications.

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Authors do not report any disclosures.

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