
PERINATAL SOCIETY OF SINGAPORE

GUIDELINES ON PHYSICAL ACTIVITY & EXERCISE IN PREGNANCY

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Exercise in Pregnancy Committee

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Introduction

The prevalence of obesity is high in Singapore and a local study showed that 23.9% of pregnant women were overweight and 10.8% were obese. (1) Overweight and obesity are significant independent risk factors for gaining excessive gestational weight. (1) Substantial evidence in epidemiological studies have described increased risks associated with obesity in pregnancy including an increased risk of gestational diabetes (2), hypertensive disorders (3), labour dystocia (4) and higher rates of caesarean delivery (5). Consequently, fetuses of obese mothers are at a greater risk of macrosomia (6), stillbirth and congenital malformations. (7) Appropriate weight management for overweight and obese Singaporean women prior to, during and after pregnancy is therefore important.

Physical activity is an integral component of lifestyle behaviours that help women moderate their body mass index (BMI) and gestational weight gain (GWG). A local study showed that excessive gestational weight gain (GWG) increases the risk of delivery by caesarean section, postpartum weight retention and having a high-birthweight baby (8). Lifestyle interventions including diet, physical activity and behavioural changes may reduce these risks by prevention of excessive weight gain. The optimal body mass for Asian adults differs from Caucasian populations (9). A recent local study defined the optimal GWG by pre-pregnancy BMI category to be 19.5 kg for underweight, 13.7 kg for normal weight, 7.9 kg for overweight and 1.8 kg for obese women respectively. (10)

In general, more physical activity is associated with greater benefits and enhances physical and mental health. Research into the effects of physical activity and exercise in pregnancy on GWG and pregnancy outcome have shown an overall benefit on limiting GWG and preventing adverse maternal and fetal outcomes. (11-12)

Guideline Summary

Our objective is to provide guidance on pre- and postnatal physical activity for pregnant women and to encourage the implementation of healthy lifestyles to achieve better pregnancy outcomes. This guideline summary does not define a standard of care, nor is it intended to dictate an exclusive course of management. It is acknowledged that practices vary and must be individualized with resources and limitations unique to the place of practice.

Evidences

An electronic search of the available evidence on this topic was retrieved up to November 2019. Results was limited to English reading materials and quality of evidence rated. This guideline is recommended for health care professionals involved in the holistic care of pregnant women regarding the safety, feasibility and acceptability of physical activity in pregnancy and the postpartum period.

STATEMENTS

1. Physical activity has minimal risks and should be encouraged in pregnancy.

Women can be reassured about the safety of physical activity by highlighting the benefits and lack of harm in uncomplicated pregnancies. Physical activity in uncomplicated pregnancies is not associated with miscarriage, stillbirth, fetal anomalies, preterm birth, preterm prelabour rupture of membranes or neonatal death. A recent meta-analysis showed that vigorous intensity exercise completed even into the 3rd trimester appears to be safe with no significant differences in small for gestational age, low birth weight or prematurity. (13)

2. Physical activity has been shown to be beneficial in women with uncomplicated pregnancies.

Physical activity is paramount in the optimisation and maintenance of healthy lifestyles in pregnancy. In particular, obese pregnant women should be encouraged to engage in physical activity with healthy lifestyle modifications. The benefits of exercise include improved cardiorespiratory fitness, enhanced psychological well-being, reductions in gestational weight gain (GWG), prevention of obesity and its associated increased maternal adverse outcomes including gestational diabetes, preeclampsia, caesarean section rates and post-partum weight gain. (14,15) GWG has also been associated with fetal macrosomia and neonatal adiposity. (16)

A systematic review and meta-analysis by Khan et al showed that physical activity reduces GWG (OR -0.7 kg, CI -0.92 to -0.48, I² =14.1 %, 33 studies, 9320 women) and lowers the odds of caesarean section (OR 0.91, CI 0.83-0.99 I²=0%, 32 studies, 11410 women) with no evidence that this effect differs across subgroups defined by maternal characteristics. (17) Hence, health care professionals should avoid variations in lifestyle advice and care rendered to women based on ethnicity, age, and underlying medical conditions.

3. Physical activity is safe for pregnant women and their fetuses in the absence of any obstetric contraindications and medical complications.

All women without contraindications should remain physically fit throughout pregnancy. Anatomical and physical changes in pregnancy include increased weight gain, forward shift in centre of gravity and accentuated lumbar lordosis which may cause low back pain. (18) Blood volume, heart rate, stroke volume, cardiac output and respiratory rate increase in pregnancy to provide adequate circulatory reserves for pregnant mothers and fetuses. All pregnant women should be physically assessed by healthcare providers before embarking on and continuing physical activity. The PARmed-X for pregnancy developed by the Canadian Society for Exercise Physiology in 2015 serves as a checklist for health care providers to evaluate and assess pregnant women prior to their participation in exercise. (19)

4. It is recommended for women to resume exercise in the post-partum period.

Physical exercise can be resumed gradually after delivery as soon as certified medically safe depending on mode of delivery and the presence of any complications. Pelvic floor exercises which reduce the risk of urinary incontinence can be initiated in the immediate postpartum period. Evidence has also shown that physical exercise can reduce postpartum weight gain and reduces the risk of deep vein thrombosis. In addition, regular aerobic exercise does not affect lactation or infant growth and can be safely continued in the post-partum period.

5. Healthy women with uncomplicated pregnancies should aim to accumulate at least 150 minutes of moderate-intensity physical activity each week.

Women with uncomplicated pregnancies are recommended to engage in at least 20 to 30 minutes of moderate-intensity physical activity per day, for a minimum of 3 days per week, but ideally on most days of the week. Physical activity should incorporate a variety of aerobic and resistance training activities for greater benefit (20). Examples of moderate-intensity aerobic physical activity, depending on fitness level, include

brisk walking, swimming, stationary cycling, low-impact aerobics, jogging, modified yoga and modified Pilates (21). Examples of resistance-training activities include body weight exercises such as squats, lunges and push-ups; exercises with light dumbbells/weights; and resistance band exercises.

Progression of physical activity is best done in the second trimester. Moderate-intensity aerobic activity can be initiated at 3 times a week for 15 minutes per session (though it may be less for those who are highly inactive and/or unfit). Progression of activity can be done by gradually increasing the frequency of sessions in a week, duration of each session, OR intensity of each session (within the appropriate target heart rate or Rating of Perceived Exertion [RPE] [22-23]) Rate of progression should be more gradual in those who are highly inactive and/or unfit.

Certain activities are to be avoided in pregnancy. These include: contact sports such as basketball or soccer; sports with high risk of falls such as gymnastics and non-stationary cycling; sky-diving due to unknown risks related to shock forces and low oxygen saturation (24); SCUBA diving due to the risk of decompression disease to the fetus; hot yoga and hot Pilates (21). Precautions should also be adopted in prolonged or high-intensity exercise exceeding 45 minutes, as this can result in hypoglycaemia. (25) These precautions include adequate hydration, caloric intake prior to exercise or limiting each exercise session per day in a cool environment.

6. Pregnant women with certain medical conditions should not exercise and should consult their health care provider early.

Pregnant women with the following medical conditions should be cautious and consult their health care provider early with regard to exercise. The below list is not exhaustive and clinicians should exercise discretion in their advice to patients based on the individual patient's risk factors as a whole.

• Absolute contraindications to exercise include:

Significant heart disease; restrictive lung disease; incompetent cervix including cerclage; intrauterine growth restriction; multiple gestation at risk of preterm labour; unexplained vaginal bleeding or persistent second- or third-trimester bleeding; placenta previa after 26 weeks gestation; pre-eclampsia or pregnancy-induced hypertension; preterm labour; preterm pre-labour rupture of membranes (PPROM); severe anaemia; uncontrolled systemic disorders including hypertension, thyroid disease and type 1 diabetes.

• Relative contraindications include:

Anaemia; unevaluated cardiac arrhythmias; mild to moderate cardiovascular disease; chronic bronchitis or other mild to moderate respiratory disease; malnutrition, extreme underweight or eating disorders; morbid obesity; heavy smoker; history of extremely sedentary lifestyle; history of spontaneous preterm birth, premature labour miscarriage or fetal growth restriction; orthopaedic limitations; poorly controlled seizures; recurrent pregnancy loss; other significant medical conditions.

7. Pregnant women should take precautions while exercising to minimise injury

Temperature regulation is highly dependent on hydration and environmental conditions. Pregnant women should aim to stay well hydrated before and after exercise. Staying in a cool environment, wearing loose-fitting clothing and avoiding exercise in excessively warm weather is recommended, (26), although exercise in general would not be expected to increase core body temperature into the range of concern. (27).

High-intensity physical activity or prolonged physical activity more than 45 minutes in duration can result in hypoglycaemia and/or dehydration, thus precautions such as adequate hydration, caloric intake prior to exercise, reducing the duration of the exercise session, and carrying out physical activity in a cool environment should be taken (25).

All women should perform adequate 'warm up' and 'cool down' exercises to condition major muscle groups for good posture, support and reduction of risk of injury. It is also important to maintain continuous breathing throughout the exercise.

8. Pregnant women should take into account safety considerations with regard to exercise

The following should be avoided for safety reasons:

- Contact sports and activities that increase risk of falls
- Valsalva manoeuvre (straining while holding breath) as this causes vasovagal stimulation, and the ensuing hypotension can lead to syncope
- Lying supine after the 4th month of pregnancy whilst exercising as this can lead to aortocaval compression and hypotension
- Rapid changes in direction and bouncing during exercises as this increases the risk of injury
- Excessive abdominal exercises as this may lead to diastasis of the recti muscles

9. The intensity of physical activity can be safely monitored in pregnancy

Intensity of physical activity in pregnancy can be monitored by various means. One of these is the 'talk test', whereby the individual is considered to be doing moderate intensity physical activity if he or she is able to talk but unable to sing while doing the activity. Rating of Perceived Exertion (RPE) can also be used to determine the intensity of physical activity, with moderate intensity physical activity corresponding to an RPE of 13-14 on the 6-20 Borg scale, or 5-6 on the 0-10 Borg scale (20). Pregnant women may also consider monitoring their physical activity intensity based on target heart rate ranges for pregnant women. (28)

For women who have been habitually exercising at vigorous-intensity aerobic activity before pregnancy, they may be able to continue these activities during pregnancy and postpartum. As heart rate predicted from RPE may be significantly underestimated during pregnancy (29), women who are engaging in vigorous-intensity physical activity may want to monitor both RPE and heart rate. Pregnant women should avoid exercising at an intensity greater than 90% maximum heart rate (MHR) until further research can confirm its safety. (13)

10. Pregnant women with warning signs should stop exercising and seek immediate medical attention

Pregnant women should stop exercising and seek immediate medical attention if they experience any of these signs and symptoms including (20)

- Chest pain
- Shortness of breath before exertion or persistent and excessive shortness of breath not resolved at rest
- Regular, painful contractions
- Vaginal bleeding
- Leaking amniotic fluid or rupture of membranes
- Muscle weakness affecting balance
- Calf pain or swelling
- Dizziness, syncope or faintness that does not resolve on rest
- Headache

ANNEXES

Perinatal Society of Singapore Guidelines on Physical Activity & Exercise in Pregnancy – SUMMARY STATEMENTS and Practical Reference for Physical Activities During Pregnancy are attached.

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This guideline summary, produced by the Perinatal Society of Singapore and endorsed by the Obstetrical & Gynaecological Society of Singapore and Exercise is Medicine Singapore, acts as an educational aid and reference for healthcare professionals practicing in Singapore. The guideline summary does not define a standard of care, nor is it intended to dictate an exclusive course of management. It presents recognized clinical methods and techniques for consideration by practitioners for incorporation into their practice. It is acknowledged that management may vary and must always be responsive to the need of individual patients, resources, and limitations unique to the institution or type of practice.

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GUIDELINES ON PHYSICAL ACTIVITY & EXERCISE IN PREGNANCY

SUMMARY STATEMENTS

1. Physical activity has minimal risks for most and should be encouraged in pregnancy.
2. Physical activity has shown to be beneficial in women with uncomplicated pregnancies.
3. Physical activity is safe for pregnant women and their fetuses in the absence of any obstetric contraindications and medical complications.
4. It is essential for women to maintain exercise in the post-partum period.
5. Healthy women with uncomplicated pregnancies should aim to accumulate at least 150 minutes of moderate-intensity physical activity each week.
6. Pregnant women with certain medical conditions should not exercise and should consult their health care provider early.
7. Pregnant women should take precautions while exercising to minimise injury.
8. Pregnant women should take into account safety considerations with regard to exercise.
9. The intensity of exercise can be safely monitored in pregnancy.
10. Pregnant women with warning signs should stop exercising and seek immediate medical attention.

PRACTICAL REFERENCE FOR PHYSICAL ACTIVITIES DURING PREGNANCY

MATERNAL AGE (yrs)	FITNESS LEVEL/BMI	HEART RATE RANGE beats/min *	FREQUENCY	TYPE OF EXERCISES
Less than 20	-	140-155	Begin 3 times per week and progress to 4 times a week or accumulate at least 150 minutes of moderate intensity physical per week	Warm-up and cool-down exercise in any physical activity regimen Recommended activities Walking, swimming, stationary cycling, low-impact aerobics, modified Yoga, Pilates modified, aqua-fitness. Activities to be avoided: Contact sports, activities with a high risk of falling, scuba diving, sky diving, hot yoga or hot Pilates
20-29	Low	129-144		
	Active BMI > 25 kg/m ²	135-150 102-124		
30-39	Low	128-144		
	Active	130-145		
	BMI > 25 kg/m ²	101-120		

· Rating of Perceived exertion (RPE) of 12-14 (somewhat hard is appropriate for most pregnant women)
· Additional "Talk test" that allow one to keep up a conversation for final check to avoid overexertion.
Adapted from PARmed-X for Pregnancy 2015

Ratings of perceived exertion (RPE)	
6	
7	Very, very light
8	
9	Very light
10	
11	Fairy light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very Hard
18	
19	Very, very hard
20	

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Safety precautions of prenatal physical activity

- Avoid physical activity in excessive heat.
- Avoid activities which involve physical contact or danger of falling.
- Avoid scuba diving.
- Maintain adequate nutrition and hydration—drink water before, during and after physical activity.
- Those considering athletic competition or exercising significantly above the recommended guidelines should seek supervision from an obstetric care provider with knowledge of the impact of high-intensity physical activity on maternal and fetal outcomes.

Reasons to stop physical activity and consult a healthcare provider

- Persistent excessive shortness of breath that does not resolve on rest
- Severe chest pain
- Regular and painful uterine contractions
- Vaginal bleeding
- Persistent loss of fluid from the vagina indicating rupture of the membranes
- Persistent dizziness or faintness that does not resolve on rest