

Addressing optimal maternal weight and exercise during the preconception period and pregnancy

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Summary

Pregnancy is an opportunity for women to access the healthcare system and address their health needs. Before and during pregnancy, providers should emphasize assisting women in interventions aimed at establishing a healthy weight and exercise regimen and should tailor their guidance based on a woman's baseline level of fitness. Doing so will improve a woman's likelihood of pregnancy and improve outcomes if she does become pregnant. Our goal is to propose actions providers should take to improve a woman's understanding of and ability to manage her weight and exercise goals during the preconception and pregnancy periods.

Key words: Prenatal counseling; Prenatal exercise; Fitness; Activity.

Introduction

Obstetricians and gynecologists (Ob/Gyns) play a crucial role in providing preventive healthcare for millions of women annually. Paramount to providing women comprehensive medical care before and during pregnancy is the need to address optimal weight and an exercise routine. In retrospective studies, nearly half of all women report no discussion with any healthcare provider on weight or nutrition during pregnancy, and 37% of women received no guidance on physical activity in general [1]. In turn, almost half of pregnant women report intended prenatal weight gain discordant with professional organization recommendations [1]. This article aims to offer recommendations for discussing a healthy weight and exercise regimen before and during pregnancy, such as specific activity type and duration appropriate for women at different stages of pregnancy. Further discussed are considerations for women of differing baseline fitness levels.

Preconception Period

Before conception, women's healthcare providers should incorporate weight and exercise assessments and recommendations as a component of the well-woman visit. The American College of Obstetricians and Gynecologists (ACOG) emphasizes the utility of regular weight and body mass index (BMI) evaluation, along with discussions of diet, nutrition, and physical activity [2]. Similarly, ACOG highlights the importance of creating healthy habits, noting that well-woman visits provide an opportunity for providers to counsel women about maintaining a healthy lifestyle and minimizing potential health risks [3]. It is particularly crucial to educate women of childbearing age on optimizing overall health before pregnancy and to

provide additional resources aimed at helping maximize their health, such as referral to a dietician, if needed. Specifically, addition of a dietician to a patient's intervention program as a care coordinator is shown to improve weight loss and quality of life [4]. While physicians are generally able to provide patients guidance on nutrition and exercise, a dietician may allow for more expertise and time spent working with patients on these topics. Some patients may have these services covered by their insurance plan. As an alternative, physicians may choose to provide patients with easily referenceable education materials in the form of a pamphlet or digital resources on the topics of weight and exercise.

Establishing an understanding of a healthy baseline weight allows for an improved transition to preconception counseling once a patient determines they are ready to conceive. An optimal preconception BMI and exercise routine can help women enhance fecundity and reduce complications that may arise from being sedentary and over- or underweight during pregnancy (ie, pregnancy loss, gestational diabetes [GDM], hypertensive disorders of pregnancy, and labor abnormalities) [5, 6]. For specific patients, such as those with polycystic ovarian syndrome or obesity, weight loss is known to improve endocrine imbalances and increase pregnancy rates [7]. Obesity, in particular, is shown to have a negative impact on the endometrium, oocytes, and embryo quality [8]. Therefore, it is ideal to reduce this risk factor as much as possible and for women to work towards a healthy pre-conception weight. Before conceiving, women should aim to reach a normal BMI of 18.5-24.9; however, they should be encouraged that any weight loss will have benefits. Even a 5% weight loss has led to improvement of metabolic and ovulatory parameters in some obese women [9, 10].

Providers should assess a woman's comprehension of what it means to have a healthy lifestyle and the potential consequences of an unhealthy lifestyle, along with her overall attitude towards weight control and exercise [5, 11]. Rather than only providing patients a series of recommendations, it is preferable to help patients recognize unhealthy practices, assess their motivation for these practices, identify their willingness to change, and provide assistance when the patient determines they are ready to make changes [12]. For example, a provider may ask patients what they view as obstacles to achieving a target weight prior to pregnancy. This approach of motivational interviewing has also been identified as a favorable strategy for limiting weight gain in pregnant patients [13]. Since not all patients may be ready for change, providers should assess a patient's willingness to change by assessing where they fall on the "Stages of Change" model, which includes steps of precontemplation, contemplation, preparation, action, and maintenance [14].

Counseling women prior to conception has been shown effective in educating women about their risk factors, implications for pregnancy, and ways to limit these risk factors [15]. Similarly, preconception counseling leads to improved patient outlook on physical activity and perceived influence of their control of preconception and obstetrical outcomes [16]. Regular exercise before pregnancy is one of the strongest predictors of patients who will regularly exercise prenatally [17, 18]. Given patients' varying baseline fitness, recommendations should be adjusted accordingly.

Women with no or limited exercise routine

For women not at an ideal weight or exercising, it is reasonable to expect exercise and weight counseling to take place across multiple visits [19]. The option to delay pregnancy in order to achieve a healthy bodyweight and fitness level must be balanced against a potential decrease in fertility associated with aging and should be discussed with patients [20]. Not all providers may have the time or expertise to offer intensive weight and exercise counseling. Therefore, providers should have resources available for referral to help in managing these patients (ie, dietitians, support groups, nutritional and psychological counselors, and exercise professionals).

Women with no or minimal exercise baseline should start with short periods of light activity, in order to avoid injury and increase adherence. Physicians should support women through this initial stage, highlighting that even light activity is an improvement and provides health benefits over sedentary activity. Light-intensity activities include aerobic activities, such as slow walking up to 30 minutes a day, 3–5 days a week, light strength training, and light household tasks [21]. As she establishes a routine and builds stamina, she can transition to a more moderate-intensity program.

Preconception, women with some degree of fitness baseline, but no regular exercise routine, should engage in moderate-intensity aerobic exercise for at least 30 minutes a day, 5 days a week, given they are otherwise healthy and

without exercise restrictions or contraindications [20]. If weight loss is the primary objective, exercise in conjunction with healthy diet is more effective than exercise alone [20]. Individuals with comorbid conditions or physical limitations should discuss with their healthcare provider before starting any fitness program [21].

Moderate-intensity activities fall between a perceived effort of 5–6 on a scale of 0–10, with 0 being sitting and 10 being maximum effort [21]. Moderate-intensity is also characterized as the level of effort where a woman cannot sing but can maintain a regular conversation during activity [21]. Table 1 lists some options for moderate-intensity exercise for both pregnant and nonpregnant women.

Table 1. — *Examples of moderate-intensity exercises for pregnant and nonpregnant women^a.*

Yoga, Pilates, or calisthenics
Brisk walking or jogging outdoors or on a treadmill
Cycling on a stationary bike or outdoors on a flat course
Hiking
Water aerobics
Swimming
Light yard work
Ballroom dancing
Strength training
^a Pregnant patients should discuss all proposed activities with their obstetricians before initiation. Proper form should be maintained and situations that may impair balance or decrease placental perfusion should be avoided.

Women with an established exercise routine

Women with an established routine prior to pregnancy have been shown to have less weight gain during pregnancy [22]. A woman who exercises frequently may find difficulty conceiving if her exercise pattern results in her developing the female athlete triad, which consists of decreased energy stores, menstrual dysregulation, and diminished bone density [23]. Having a discussion with these patients before pregnancy is ideal so any risk factors for reduced fertility or maintaining a future healthy pregnancy can be discussed.

During Pregnancy

Weight gain recommendations for a singleton pregnancy depend on a woman's pregestational BMI (see Table 2) [15]. Proper weight gain, nutrition, and exercise should be discussed at the initial prenatal visit and revisited at subsequent encounters [6]. Associations exist between excessive gestational weight gain, rates of large-for-gestational-age neonates, GDM, hypertensive disorders of pregnancy, and difficulty losing the weight postpartum [15]. Offspring may also face long-term consequences of excessing mater-

nal gestational weight gain, as this has been associated with higher offspring BMI [24] and cardiovascular disease [25-27].

Table 2. — *Recommended weight gain during pregnancy [15].*

Pregravid BMI (kg/m ²)	Total Weight Gain (lb)
< 18.5	28–40
18.5–24.9	25–35
25–29.0	15–25
≥ 30	11–20

Often, obese pregnant women expect to gain weight or are concerned if not gaining weight. A dialogue between the patient and her provider should occur to calm her fears or anxiety, as well as educate her that minimal weight gain is ideal in women with a high BMI in order to minimize weight-related complications. A dietician referral to establish healthy dietary routines is ideal, even in nondiabetic patients. If there are any concerns regarding fetal growth, fetal growth scans should be initiated.

Women with no or limited exercise routine

Women without established exercise routines and no medical contraindications can start with slow walking with or without light strength training for up to 30 minutes a day, 3–5 days a week. They should build stamina over time and increase the duration and frequency as tolerated, with the goal of engaging in at least 150 minutes of moderate-intensity aerobic activity spaced throughout the week (see Table 1 for examples). Implementing an exercise routine in women without established exercise routine in pregnancy may reduce the risk of GDM and excessive gestational weight gain [21]. Specific activities may also help with postpartum conditions, as is seen with pelvic floor strengthening and reduced postpartum urinary incontinence [28, 29].

If a woman has not been exercising or has preexisting health conditions or complications during pregnancy, she should talk with her provider about the possibility of maternal heart rate monitoring. If there is a concern, utilizing the “talk test” during pregnancy is recommended. This means that if a woman is still able to carry on a conversation while working out, her heart rate is likely in an acceptable range. While some organizations recommend specific heart rate maximums determined by maternal age and exercise intensity as a means of preventing overexertion, others, including ACOG, favor using perceived exertion as a more accurate monitoring parameter [30-32].

For women unaccustomed to regular exercise, beginning an exercise routine while pregnant can be intimidating and challenging. Women note body changes, discomfort, and a lack of a social group as hindrances [33, 34]. Other limiting factors are fatigue and a perceived lack of time

[33, 34]. Some women may also be restricted in exercise options due to limited safety or availability of appropriate recreational areas [19]. In women who are able to incorporate group exercise into their prenatal routine, there is a significant improvement in reported well-being, quality of life, and mood [35, 36]. These women also experience fewer episodes of nausea, vomiting, and fatigue compared to a control group [35]. Compared to nonexercising pregnant women, women who do exercise demonstrate reduced odds of developing prenatal depression and have less severe symptoms in those who do develop depression, though no difference is observed in odds of developing anxiety during or after pregnancy or postpartum depression [37].

Unclear guidelines for exercise in pregnancy are also shown to reduce a woman’s participation in activities. To reduce confusion, providers should clearly outline what is advised during pregnancy, including activity type, duration, intensity, and frequency [38]. Patients should be given a clearly outlined list of general advice and precautions for exercise in pregnancy (see Table 3) and a list of warning signs that a given activity may be too strenuous and should be stopped (see Table 4).

Exercise programs that are supervised and incorporate dietary modifications, particularly those that simultaneously incorporate individualized plans with specific weight goals, are found to be most effective at limiting weight gain in overweight or obese pregnant women [39]. Solely counseling these women on gestational weight gain and prenatal physical activity, without directed activity intervention, has not been shown to be effective [39].

Regardless of BMI, lowered prevalence of GDM and less gestational weight gain are observed when a supervised program is initiated in the first trimester [40]. When supervised exercise programs are begun later in pregnancy, from 13–18 weeks, differences in GDM incidence and gestational weight gain may still occur but are not always detected [41-44]. Supervised programs typically involve periodic meetings of the patient, in a group or individual setting, and a health coach. During the meetings, participants will go through guided aerobic and resistance training regimens, while also receiving “homework” assignments of activity tasks to complete before the next meeting. Participants may also have sessions with their health coach where dietary, social, and other concerns are addressed.

Women with an established exercise routine

Women accustomed to physical exercise before pregnancy cite continuing to exercise during pregnancy as a way to maintain part of their normal routine amid the many pregnancy changes they experience, though their typical exercise routine may need to be modified as the pregnancy progresses [33]. Women should be willing to listen to their bodies and make changes to exercise routines to accommodate the growing uterus, physiologic fatigue of pregnancy, and limitations on the physical ability for more intense exercises as the pregnancy progresses. Care should be taken to avoid both direct and indirect trauma to the

Table 3. — *The Do's and Don'ts of working out while pregnant.*

<i>Do's</i>
1. Stay well hydrated
2. Wear a good pregnancy support belt
3. Wear a good sports bra
4. Have a cool down period after working out
5. Take breaks and listen to your body
6. Stretching before and after activity
<i>Don'ts</i>
1. Become overheated
2. Stand still or lay flat on your back for prolonged periods of time
3. Do exercises that could increase your risk of direct abdominal trauma or falling
4. Push yourself as hard as you would if you were not pregnant
5. Feel bad if you have to cut your workout short or modify it, especially later in pregnancy
6. Continue a workout if it hurts

Table 4. — *Signs the exercise activity is too strenuous during pregnancy.*

1. Feeling dizzy, faint, or unstable
2. Shortness of breath before starting the exercise or inability to carry on a conversation during exercise
3. Chest discomfort
4. Headache or visual changes
5. Uterine contractions or cramping
6. Heart palpitations
7. Vaginal bleeding or leakage of amniotic fluid

gravid uterus and abdomen that can occur with more vigorous high-impact and high-contact activities. Activities, such as contact sports, any exercises that may increase risk of falling or becoming overheated, skydiving, scuba diving, or exercises at altitudes over 6000 feet (if she does not already live at altitude), should be amended, discontinued, or replaced. If a woman has been routinely exercising prior to pregnancy and is otherwise healthy without pregnancy complications, monitoring heart rate is not necessary.

Maternal and Fetal Considerations During Exercise

Women should make adjustments for a changing center of gravity as pregnancy progresses to avoid musculoskeletal injuries or positional imbalances, which can result in fetal trauma should a fall occur. While relatively stable in the first trimester of pregnancy, maternal balance and posture are found to decline beginning in the second trimester [45]. Women should be mindful of this change as pregnancy progresses and consider incorporating lower impact activities, such as swimming or walking, as they come closer to term. Additionally, women should avoid activities that may restrict uterine and fetal perfusion, such as yoga poses or stretches involving remaining supine for extended periods of time, particularly after the first trimester [21]. Though not associated with lower birth weight or unfavorable maternal outcomes, these positions have been shown to induce acute aberrant FHR tracings and diminish uterine perfusion,

even in the case of a normal pregnancy [46, 47]. If complications arise during pregnancy, ie, high blood pressure, diabetes, or placenta previa, it is important to discuss whether or not certain activities, such as strength training, should be discontinued.

In the first trimester there is concern for an elevated core body temperature, above 103 F° (39 °C), and a higher risk for fetal neural tube defects [48]. Moderate-intensity exercise has not been shown to raise core body temperature above this level [48]. Even with slight elevations in maternal temperature with exercise, prenatal exercise has not been shown to raise the odds of developing fetal congenital anomalies, though most studies involved women >12 weeks gestation where there is, at baseline, an already minimal risk of developing anomalies [49].

Both aerobic and resistance exercises result in increased hemodynamic parameters during exercise, comparable to that in nonpregnant women, without adverse effects in healthy pregnancies [50, 51]. In terms of fetal response in uncomplicated pregnancies, fetal biophysical profiles and fetal heart rate monitoring are consistently reactive and reassuring after moderate and strenuous exercise sessions, regardless of prepregnancy exercise levels [52-57].

Exercise in Elite or Competitive Athletes

Competitive athletes are often faced with peak fertility coinciding with peak fitness. If pregnant, these women, who are accustomed to high-intensity exercise, benefit from

counseling on expectations for a fitness regimen during and after pregnancy, as they are known to follow more rigorous schedules prenatally and postpartum [20]. A competitive athlete may be taking over-the-counter nutritional or dietary supplements in their training. These supplements do not require premarket Food and Drug Administration (FDA) approval and in some cases have been found to have inaccurate and possibly harmful ingredients; therefore, physicians should be diligent in reviewing all medications and supplements a woman is using before and during pregnancy [58]. Limited data from the general population indicate that women may benefit from reducing physical strain and high-impact activities around the time of ovulation and implantation, while avoiding heavy lifting during the first trimester, as these have been associated with increases in spontaneous miscarriages in some cohort studies [59-61].

These athletes must be counseled on the importance of close monitoring of body temperature, hydration status, and nutrition intake to avoid hypoglycemia during exercise and overall weight loss during pregnancy, both of which can impair fetal growth [20]. Women are able to maintain maximum aerobic power and VO₂ maximums comparable to prepregnancy levels [21], although they should discuss with their physician if and how they may need to alter their regimens during pregnancy. Women should be aware of the potential for developing physiologic anemia of pregnancy and its impact on training [62]. Elite athletes are at added risk for activity-related injuries in pregnancy, largely due to compensatory measures taken to counterbalance a changing anatomy, such as pelvic instability or postural changes [62]. In general, it is advisable for women to preserve fitness but refrain from efforts to prepare for elite competition [63]. Providers should plan to discuss with these patients not to limit their diet or increase their activity in order to maintain competition-level body weights.

Training at altitude is not advisable during pregnancy due to concern for impaired fetal oxygen saturation, though no studies have fully evaluated altitude training during pregnancy in elite athletes. Women involved in strength training should be aware that Valsalva maneuvers can cause sharp blood pressure spikes with possible decreased fetal perfusion, though the effects of such maneuvers are not fully studied [64].

Summary

Maintaining an optimal weight and exercise routine during the preconception period and during pregnancy is ideal in women of childbearing age. Ob/Gyns have the unique ability to counsel, educate, assess, and encourage women during these crucial stages of their lives. While there may be comorbid conditions that place restrictions on certain patients, there are many tools available to educate them on how to maintain a healthy diet and implement lower-intensity exercises. With the many resources available, there are various strategies proven effective in optimizing maternal weight and exercise in pregnancy, though

adherence is often a limiting factor. Future research should focus on ways to optimize adherence to programs, particularly in resource limited settings. Additionally, evidence points towards a potential shift in the prenatal visit model to reduce the total number of prenatal visits and in-person visits, based on patient preference and from the perspective of resource allocation. Providers must be prepared to adapt to this changing model and to balance this new trend against the continued need to counsel women on appropriate weight and exercise guidance during her prenatal journey [65-67]. An unhealthy lifestyle can have far-reaching consequences on both mother and baby. As a result, providers should continue to make every effort to intervene and educate when possible.

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Conflict of Interest

The authors declare no conflict of interest.

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