Indian Journal of Obstetrics and Gynecology
Volume 2 Number 1, January - June 2014

Aerobic Exercises During Pregnancy: To Advise or to Avoid?

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Received on

Accepted on

Abstract

The objective of this review paper was to provide a directional explanation to the debate of whether or not to exercise during pregnancy by examining the evidence from articles in PubMed database. This review article distinguished the evidence of efficacy for aerobic exercises in pregnant women through studies on physiological responses, exercise prescription considerations, maternal and fetal health benefits, and systematic reviews/ meta-analyses. The existing evidence reiterated the safety of aerobic exercises in all three trimesters, and a simple walking exercise program was shown to be beneficial of all health-related outcomes including quality of life in pregnant women.

Keywords: Gynecological rehabilitation; Obstetric rehabilitation; Prenatal exercises; Exercise training.

Introduction

The objective of this review paper was to provide a directional explanation to the debate of whether or not to exercise during pregnancy by examining the evidence from articles in PubMed database.

The endocrine effects of pregnancy induce striking changes in maternal metabolism, cardiovascular regulation, acid-base balance, and thermoregulation both at rest and during standard submaximal exercise, all of which were positively influenced by moderate fitness conditioning on maternal metabolic and cardiopulmonary capacities without altering fetal development or pregnancy outcome.[1]

American College of Obstetricians and Gynecologists (ACOG) recommended aerobic exerciseduring pregnancy in absence of conclusive evidence supporting either the safety or danger of exercise to the fetal-maternal unit.[2]

Gestational aerobic exercise in all three trimesters of pregnancy had beneficial effects on improving aerobic fitness (predicted maximum oxygen consumption values as determined by using standard Bruce treadmill protocol during the first and third tests and the Astrand protocol for submaximal testing on a bicycle ergometer during the third trimester), without any associated neonatal morbidity and obstetric complications. [3]

Physiological Responses

Maternal physiological responses to aerobic exercise during pregnancy and post-partum as listed by Uzendoski *et al*[4] were:

(a) the maternal submaximal oxygen consumption (1/min) at a constant heart rate remained essentially unchanged during the last two trimesters of pregnancy and eight months post-partum,

(b) the fetal heart rate returned to near-baseline levels within a two-minute exercise recovery, and

(c) the infant birth data were all within the normal range.

The cardiovascular responses include increased cardiac output, increased mass and dilation of the left ventricle which allows maintenance of wall stress, ensuring adequate pumping function throughout gestation, without much alterations in mean arterial pressure response because the increased blood flow to the uteroplacental unit, skin, and kidneys results in a concomitant decrease in systemic vascular resistance.[5]

The metabolic responses to aerobic exercises performed in water were found by McMurray *et al*[6] as follows: Exercise oxygen uptakes and the work load required to elicit the VO2 decreased during the thirty-fifth week of pregnancy. Exercise heart rates, blood glucose levels andlactate concentrations declined with advancing pregnancy after exercise, with elevated blood triglyceride levels and plasma cortisol concentrations. McMurray et al[7] found lower post-exercise plasma glucose levels and plasma insulin levels, increased plasma triglycerides and NEFA, with the NEFA responses at the end of the walking trials were significantly greater at the end of the 40-min aerobic dance trials.

Exercise Prescription Considerations

Wolfe *et al*[8] advised women to select safe, non-ballistic exercise modalities and to avoid thermal or hyperbaric environmental stress during exercise and also to avoid exercising in the supine position during late gestation. Prescribing and monitoring exercise intensityshould involve use of perceived exertion scales instead of heart rate. Considerations prior to initiating a new exercise programme during pregnancy include methods for prevention of fetal hyperthermia, the safety of weight-training/isometric exercise and optimal methods for training of pre/ postnatal fitness instructors.

Walking is not only a popular physical activity but also a form of aerobic exercise and a prenatal walking program of low (LI, 30% heart rate reserve, HRR) or vigorous intensity (VI, 70%HRR), combined with healthy eating habits, is safe and beneficial to the mother and fetus.[9] 6-weeks aerobic exercise programproduced a significant decrease in depressive symptoms and pregnancy-associated physical discomfort with increase in total self-esteem.[10]

Maternal and Fetal Benefits

Duration of labor was inversely associated with maximal oxygen uptake after adjusting for birthweightand that increased aerobic fitness was associated with shorter labor in nulliparous women who started labor spontaneously.[11] Fetal HR was significantly lower in the exercise groupduring the active fetal state at 36 weeks GA, and heart rate variability (HRV) also increased in the exercise group.[12]

60 min of low-impact aerobic exercise at an intensity between 60-70% of maximal heart rate reserve decreased anxiety and depression with decreasesin total mood disturbance, as well as significant increases in vigor in physically active postpartum women.[13] 3-month supervised exercise program, commencing at 16 to 20 weeks of gestationwhich included walking (10 min), aerobic exercise (30 min), stretching (10 min), and relaxation (10 min), reducedsymptoms of depression as assessed by the Center for Epidemiological Studies Depression Scale (CES-D).[14]

Parker and Smith[15] listed the relationship between pregnancy-associated changes and therapeutic effects of aquatic-aerobic exercise as a means of stress reduction during pregnancy:

1) Stress reactivity increases physiologically during pregnancy,
2) pregnant women may experience additional stressors that are usually not experienced in a non-pregnant state,
3) psychological stress in pregnancy is associated with adverse fetal outcome,
4) exercise can be a method of stress reduction,

5) exercise in pregnancy is not associated with adverse fetal outcome, and
6) exercise in pregnancy may provide benefit to the fetus.

3-month supervised exercise program, commencing at 16 to 20 weeks of gestation. Each session included walking (10 min), aerobic exercise (30 min), stretching (10 min), and relaxation (10 min) improved the physical function domain, the bodily pain domainand the general health domain of health-related quality of life assessed by the Colombian version of the Medical Outcome Study Short-Form Health Survey.[16]

There were no differences between aerobic and strength conditioning and a combined program comprising of treadmill or bicycle warm-up, individually prescribed exercises on weight-lifting equipment for arms, legs, abdomen, and back, and 1- to 2-mile workout on bicycle ergometer, had beneficial outcomes related to length of hospitalization, incidence of cesarean section, and Apgar scores.[17]

Systematic Reviews and/or Meta-Analyses

Among the three Cochrane systematic reviews,[18,19,20] the first concluded that regular aerobic exercise during pregnancy appeared to improve (or maintain) physical fitness; the second update concluded that regular aerobic exercise during pregnancy appeared to improve (or maintain) not only physical fitness but also body image; which was again confirmed by the third update. Available data were insufficient to infer important risks or benefits for the mother or infant.

Lamina and Agbanusi[21] did a systemic review of 11 randomized controlled trials on total of 1177 subjects for the effect of aerobic training on maternal weight in pregnancyin the MEDLINE (PubMed) database. The study concluded that aerobic training was an effective tool in maternal weight gain control in pregnancy.

This review article distinguished the evidence of efficacy for aerobic exercises in pregnant women through studies on physiological responses, exercise prescription considerations, maternal and fetal health benefits, and systematic reviews/ meta-analyses. The existing evidence reiterated the safety of aerobic exercises in all three trimesters, and a simple walking exercise program was shown to be beneficial of all health-related outcomes including quality of life in pregnant women.

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