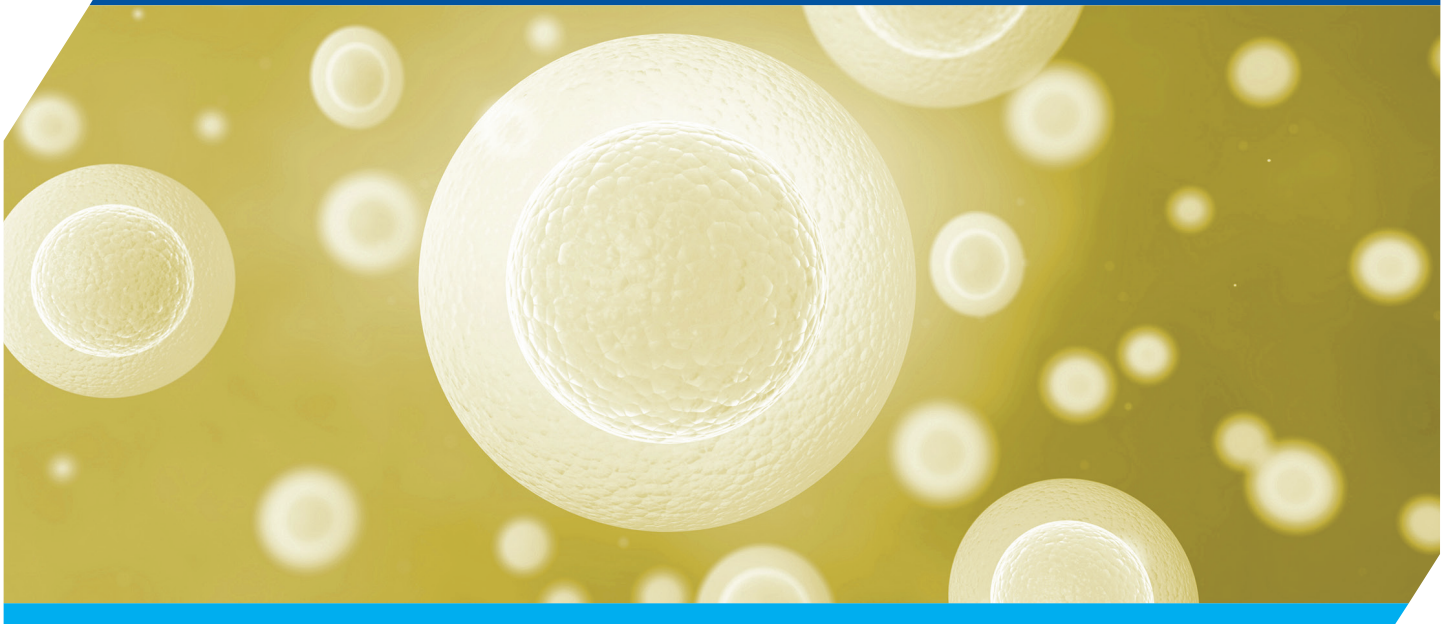




The
Fertility Society
of Australia

Pre-Conception Health Special Interest Group



The role of exercise in improving fertility, quality of life and emotional well-being

Being overweight or obese impairs male and female fertility and reduces the chance of spontaneous and assisted conception. Weight management is crucial in preventing and treating infertility. Exercise is a key component of weight management.



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Evidence review

Physical activity and female fertility

Evidence suggests that moderate regular exercise positively influences fertility and assisted reproductive technology (ART) outcomes. In a study of 26,955 women, vigorous activity (70-89% of maximum heart rate or a rate of perceived intensity of 14-16 on the BORG 6-20 scale [1]) was associated with reduced risk of ovulatory infertility [2]. Among 216 obese women starting ART, those who exercised regularly had better outcomes than their sedentary counterparts, independent of weight loss [3]. A minimum of one hour exercise three times per week improved rates of implantation and pregnancy and reduced the risk of miscarriage in 436 women undergoing ICSI [4]. Low to moderate exercise was also associated with increased implantation and live birth rates in 131 women undergoing ART [5].

However, high intensity exercise regimens appear to reduce fertility, with more detrimental effects noted for cardiovascular exercise compared to walking [6]. One cohort study reported reduced implantation and live birth rates, and increased risk of cycle cancellation and pregnancy loss at four or more hours per week exercise. A case-control study of 346 women reported that 60 or more minutes of daily exercise in the year prior to attempting conception was associated with an increased risk of infertility compared to never exercising [7].

A population-based health survey found that subfertility was associated with vigorous (exercising daily or to exhaustion) but not with lower intensity or less frequency exercise [8]. There are few studies of the effects of exercise interventions on assisted or spontaneous conception rates. A Cochrane review found no studies assessing the effect of exercise on subfertile people [9].

A systematic review identified only three studies examining the effect of exercise on fertility in overweight and obese women with polycystic ovary syndrome (PCOS) [10]. Compared to diet alone [11] or no treatment [12] exercise improved menstrual function and/or ovulation frequency. Another study found similar improvements for diet, diet and aerobic training or diet, aerobic and resistance training [13]. One study reported a trend for a higher pregnancy rate for exercise compared to diet (35% versus 10%, $p=0.058$) [11]. Studies of the effects of 12-24 week lifestyle interventions comprising diet, exercise and/or behavioural change in overweight infertile women with or without PCOS [14-17] report improved ovulatory and menstrual regularity and reduced risk of miscarriage compared to pre-intervention. The majority of participants in these studies conceived and gave birth after spontaneous or assisted conception [14-15].

Physical activity and male fertility

High intensity exercise appears to reduce male fertility. In a 60-week randomised controlled trial, semen parameters declined in men in the high (5 x 120 minutes/week) but not in those in the moderate intensity exercise group [18]. A comparison of three intensities of exercise (physically active three hours/week, water polo or triathletes) reported reduced semen quality, including semen morphology and sperm concentration, for higher intensities and durations of exercise [19]. Other studies found no relationship between sperm quality and physical activity in men attending an infertility clinic [20-21] with the exception of bicycling (five or more hours per week being associated with reduced sperm concentration and motility) [20] suggesting that the potential negative effect of exercise on semen quality relates to intensive training [22]. In one study waist circumference, independent of exercise, was

shown to have an inverse linear correlation with sperm count, suggesting that weight loss can potentially improve sperm parameters [23]. There is limited research examining the effect of exercise prior to assisted or spontaneous conception in men. Compared to low levels of physical activity, a high level of physical activity (30 minutes/day individual conditioning and 1-2 hours exercise on 3-4 days/week) was associated with lower semen volume in 69 sperm donors [24].

The effect of exercise on quality of life and emotional well-being

Exercise improves psychological parameters. From a systematic review and meta-analysis of 56 studies in healthy males and females, 3-6 months of light or moderate intensity exercise improved quality of life related to physical health (effect size (ES) 0.22, 95% confidence interval (CI) 0.07, 0.37, $p<0.05$) and psychological health (ES 0.21 95% CI 0.06, 0.36, $p<0.05$) compared to no exercise [25]. In infertile women with or without PCOS undergoing a six month lifestyle intervention (diet, exercise and behavioural intervention) prior to assisted reproduction, improvements in self-esteem and symptoms of depression and anxiety were observed [14, 15, 26]. In women with PCOS, one RCT [27] and one single-arm case series [28] assessed quality of life following exercise interventions. Depression scores [27] and body image distress [28] decreased and health-related quality of life improved [27] following 20-24 weeks of exercise ranging from a self-directed walking program [28] to a structured supervised diet, aerobic and resistance exercise intervention [27]. Furthermore, quality of life was equally improved for diet alone, diet and aerobic exercise or diet, aerobic and resistance exercise [27].

Summary

There is some evidence that moderate exercise benefits fertility and that high intensity and high frequency exercise may adversely affect fertility. There is conflicting evidence about whether exercise is more effective in improving menstrual function or ovulation compared to diet or no intervention in overweight women with PCOS. There is limited evidence about the effect of exercise on fertility in women with PCOS. There is high quality evidence in the general population for the effect of exercise in improving quality of life but only moderate quality evidence of the effect of exercise in improving fertility and quality of life in infertile women. As many studies prescribe exercise as part of a multidisciplinary lifestyle program, it is difficult to separate the effects of exercise from dietary and behavioural components and determine the type, intensity, impact (high impact/weight bearing exercise, e.g. running, versus low impact/weight bearing, e.g. cycling), or duration of exercise needed to achieve optimal reproductive benefits. Further research is required to determine the optimal intensity, impact, duration (of individual sessions and exercise program as a whole), and modality of exercise prior to pregnancy in fertile and infertile couples, the effect of exercise in combination with, and independent of other lifestyle changes, and the effect of exercise on quality of life in infertile men.

Recommendations

National and international evidence-based physical activity guidelines exist for the general population and are relevant to men and women preconception. These should be highlighted to all couples seeking ART by the medical team and accrediting bodies. The guidelines recommend at least 30 minutes of moderate-intensity physical activity on most and preferably all days of the week and including regular, vigorous activity



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where possible [29]. These recommendations are consistent with Australia's Physical Activity & Sedentary Behaviour Guidelines for Adults (18-64 year olds) that recommend a minimum of 150 to 300 minutes per week moderate intensity or 75 to 150 minutes per week vigorous intensity or an equivalent combination of moderate and vigorous intensity aerobic activity. In addition to this, moderate to high intensity muscle strengthening exercises on two or more days of the week is recommended [30]. For men and women who are overweight and obese, achieving and maintaining a modest weight loss may improve fertility and will improve other obesity-related morbidities. Exercise is an important component of obesity management. International guidelines for obesity management recommend 225-300 min/week of moderate intensity physical activity for overweight or obese adults [31]. For adults with Type 2 Diabetes, pre-diabetes or any form of insulin resistance it is advised that 210 minutes of moderate intensity exercise or 125 minutes of vigorous intensity exercise be completed per week, with no more than 48 hours between exercise sessions [1].

For more information about pre-conception health visit



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