

REVIEW ARTICLE

Yoga Can Improve Assisted Reproduction Technology Outcomes in Couples With Infertility

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ABSTRACT

Context • Depending on the cause of the infertility, nonsurgical or surgical treatments may be used to treat men and women with infertility. Despite improved outcomes due to medical advances, assisted reproductive technology (ART) for couples with infertility is sometimes unsuccessful. Success may be affected by the patient's social, psychological, and physical status.

Objective • The study examined the effects of yoga—including asanas (yoga poses), pranayama (proper breathing), shavasana, and meditation—on male and female fertility and ART outcomes.

Design • The research team performed a literature review, electronically searching for articles published between January 1978 and January 2016 in the PubMed, Scopus, ScienceDirect, and Google Scholar databases.

Setting • The study took place at the Reproductive Biotechnology Research Center at the Avicenna Research Institute at the Academic Center for Education, Culture, and Research (Tehran, Iran).

Participants • Participants were couples with infertility taking part in 87 reviewed studies.

Intervention • Yoga was the intervention.

Outcome Measures • The outcome measures comprised fertility factors in males and females, fertility rate, and ART success rate.

Results • The reviewed studies showed that yoga can provide stress management for patients with infertility, with beneficial effects on fertility, helping couples give birth. They found that yoga also could reduce pain; decrease depression, anxiety, and stress; reduce the rate of assisted vaginal delivery; and improve fetal outcomes.

Conclusions • Yoga can help couples overcome infertility and increase the ART success rate by improving the physiological and psychological states of both men and women. (*Altern Ther Health Med.* [E-pub ahead of print.]

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Fertilization is viewed as a simple notion, wherein sperm and ova join and the result is a new life, but the process is actually a series of long and complex events that must take place in a certain order. Infertility occurs in 8% to 12% of the world's couples because of genetic, psychological, anatomical, endocrinological, and immunological problems that affect both female and male reproductive health.^{1,2}

Infertility rates vary significantly among countries and regions, based on the prevalence of disease leading to infertility.² General factors affecting female infertility (ie, the ability to ovulate, conceive, or deliver a child successfully) include age, endometriosis, polycystic ovarian syndrome (PCOS), chronic diseases, hormonal imbalance, environmental factors, excessive or very low body fat, sexually

transmitted diseases, mullerian anomalies, fallopian tube disease, blockage of the cervix, multiple miscarriages, and amenorrhea.²⁻⁶

Although women's infertility is the greater focus of research and attention in health care, male infertility is the cause in or contributing factor to infertility in approximately half of couples with infertility.¹ Nearly 30% to 40% of all infertility is a result of male factors, and approximately 8% of men request medical help for problems associated with fertility.^{1,7,8} Some risk factors that can result in a decline in a man's seminal quality include a history of prostatitis, genital infections, sexually transmitted diseases, oxidative stress, hernia repair, undescended testicles, and mumps after puberty.^{2,6,9,10} Investigators have found that a 2% reduction in the quality of male sperm occurs annually.^{2,11}

Environmental stress and pollution are important parameters that can reduce hormonal profiles that stimulate spermatogenesis.² Recently, infertility rates have been growing throughout the world, and the need for infertility treatments and assisted reproductive technologies (ARTs) has increased.^{1,7} Accordingly, nonsurgical or surgical treatments, including hormone therapy, in vitro fertilization (IVF), and intracytoplasmic sperm injection, may be used to treat men and women with infertility. Despite these medical improvements, treatment remains largely unsuccessful.

Studies have shown that patients' social, mental, and physical states can strongly affect ART's success.¹²⁻¹⁵ Although antianxiety and antidepressant medications can reduce stress, they have side effects, such as a decrease in sexual drive, an inability to orgasm, and erectile dysfunction.^{16,17}

Complementary approaches to reproductive wellness, such as the methods of traditional Chinese medicine, ayurveda, yoga, and mind-body techniques for stress reduction have recently been introduced in the ART field.^{7,18-21} Yoga is a form of alternative medicine that claims to improve a person's health by reducing stress and regulating hormonal secretions.^{18,19,21-23}

The aim of the current study was to review the effects of yoga—including asanas (yoga poses), pranayama (proper breathing), shavasana, and meditation—on couples' fertility and on ART outcomes.

METHODS

Procedures

In this review, the research team searched the following electronic databases between January 1978 and January 2016. The documents were obtained from PubMed, Scopus, Science Direct, and Google Scholar using the keywords *yoga*, *fertility*, *infertility*, and *reproduction*. Two members of the research team evaluated the studies. The study included articles if the studies evaluated the effects of yoga on fertility factors and pregnant women who were randomized to yoga and control groups. There were no severe limits on control groups. Therefore, any trials that compared yoga to usual care or any other physical or mental care were qualified. Today, there are different types of yoga. Some included only physical exercise,

such as stretching, shavasana, or other asana postures. Other kinds of yoga also included pranayama, meditation, or deep relaxation. The research team included all types of studies and all types of yoga and reviewed only studies in English. The search provided 43 169 articles. Nonrandomized or uncontrolled trials, irrelevant articles, duplicated articles, or articles with duplicated data were excluded, and the remaining 87 articles were evaluated.

Participants

Participants were couples with infertility taking part in the 87 reviewed studies. Couples with infertility were married couples not being able to get pregnant after trying for 1 year. The present study comprised couples who were aged 18 to 45 years and evidence was from 5 continents.

Intervention

This study included all types of yoga as the intervention. Yoga combines breathing, meditation, and postures to bring harmony to the chakra system. It is also used to awaken the essential life force, known as kundalini energy, which is housed in the root base chakra at the base root of spine. The studies generally were between 6 and 20 weeks in duration.

Outcome Measures

The outcome measures comprised fertility factors in males such as sperm count, sperm motility, prostate secretion, genital inflammatory, varicocele, intravaginal ejaculation time, testosterone secretion, sexual desire and arousal, and DNA integrity of sperm. In females, fertility factors measured may include ovulation management and oocytes improvement; the serum levels of cortisol, adrenaline, noradrenaline, dopamine, testosterone, luteinizing hormone (LH), and antimullerian hormone (AMH); fertility rate; ART success rate; back, lumbopelvic, and other physical pain; satisfaction with pain relief; depression; anxiety; and stress.

RESULTS

In total, 87 articles were evaluated in the review.

Women With Infertility

Stress Relief. The reviewed studies supported the hypothesis that yoga could help couples give birth²⁴⁻³¹ by (1) reducing their anxiety and depression³¹⁻⁵⁷; (2) improving their sleep⁵⁸; (3) helping them manage the stresses of pregnancy, labor, and birth^{32-42,44,45,47,48,55,59-68}; and (4) improving their quality of life during pregnancy or after stillbirth for women.^{55,69}

Yoga also was found to (1) reduce back, lumbopelvic, and other physical pain^{51,53,56,70-73} and (2) increase satisfaction with pain relief.⁷⁰

Investigators also reported that stress management in patients with infertility had beneficial effects on fertility.⁷⁴⁻⁷⁸ In couples with infertility, yoga could (1) manage ovulation and oocytes improvement for fertility^{79,80} and (2) decrease depression, anxiety, and stress.^{53,81,82}

Hormonal Changes. Two studies found that alpha brain waves increased and serum cortisol significantly decreased during yoga.^{10,83} Schmidt et al found the 3 months of yoga could decrease the rate of urinary excretion of adrenaline, noradrenaline, dopamine, and aldosterone as well as improve the serum levels of testosterone and LH and increase cortisol excretion.⁸⁴ Other researchers have confirmed that yoga can reduce cortisol levels in women.^{46,50,85-87}

Exercise via 30 minutes per day of asanas, pranayama, meditation, and shavasana helped patients with PCOS lose weight and manage stress, which ultimately stabilizes the normal function of the hypothalamic-pituitary-ovarian axis.⁸⁸ Also, in 3 studies,^{89,90,91,92} a 12-week yoga program helped participants reduce their levels of AMH, LH, and testosterone, and one of those studies found improved menstrual frequency⁹⁰; one found lower anxiety⁹⁰; and one increased the quality of life of adolescents with PCOS.⁹¹

Pregnancy. Yoga was found to (1) reduce hypertensive-related pregnancies,^{62,92} (2) improve fetal outcomes,^{62,92} (3) increase the infants' birth weights,⁶¹ (4) decrease intrauterine growth retardation,^{61,62} and (5) reduce the rate of assisted vaginal delivery.⁷⁰

One study found that women who were more distressed than other women were more likely to accept psychological support before starting an IVF cycle.⁹³ A study of 143 women with infertility demonstrated that yoga could decrease distress in women before they started their first IVF cycle⁹³ and showed that it was better to start its practice at least 6 weeks before starting the cycle.⁹⁴ In addition, for women who become pregnant via IVF, yoga decreased stress, anxiety, and labor pains and increased delivery confidence.^{39,95}

Men With Infertility

The benefits of regular yoga practice were not limited to women with infertility; men with infertility also benefited.^{11,96-99} Sperm count, sperm motility, and prostate secretion showed improvement in men who practiced yoga.¹⁰ Some investigators indicated that yoga could improve genital inflammatory conditions, in addition to increasing sperm parameters and motility, and also could improve immune system disorders, varicocele,⁹⁶ and intravaginal ejaculation time and decrease sexual dysfunction.¹⁰⁰

Hu et al⁹⁶ also found that yoga could help regulate endocrinal glands and the autonomic nervous system (ANS). In men, practicing the Root Bond pose (Mula Bandha) was found to be correlated with relieving spermatorrhea, preventing inguinal hernia and regulating testosterone secretion,¹⁰ whereas the Mula Bandha pose could increase genital arousal sensations for improving sexual desire and arousal.¹⁰ Other findings showed that yoga could affect the DNA integrity of sperm and reduce some markers of oxidative stress, such as telomerase activity, telomere length, and DNA fragmentation,^{101,102} and also could delay aging, which can be applied for women, too.^{101,103}

Yoga Types and Poses

Qualified breathing can help the body's organs receive proper oxygen and energy for full functionality.^{19,104,105} For people dealing with infertility, studies have found that the beneficial yoga asanas for strengthening core, legs, and feet and can help to move energy in the sacral chakra area, while being firmly rooted through the feet and balanced throughout the root chakra. These poses are (1) Standing Forward Bend (Uttanasana), (2) Garland (Malasana), (3) Head-to-Knee Forward Bend (Janu Sirsasana), (4) Reclining Bound Angle (Supta Baddha Konasana), (5) Wide-Legged Forward Bend (Prasarita Padottanasana), (6) Warrior II (Virabhadrasana II), (7) Mountain Pose (Tadasana), (8) Warrior One Pose (Virabhadrasana 1), and (9) Bridge Pose (Setu Bhandasana).^{19,28,106} Other poses that could be useful are (1) Pigeon, (2) Wide-Angle Seated Forward Bend (Upavistha Konasana), (3) Cow Face (Gomukhasana), (4) One-Legged King Pigeon (Eka Pada Rajakapotasana), (5) Bound Angle (Baddha Konasana), (6) Revolved Triangle (Parivrtta Trikonasana), (7) Full Boat (Paripurna Navasana), (8) Chair (Utkatasana), (9) Triangle Pose (Trikonasana), (10) Child Pose (Balasana), (11) Cobra Pose (Bhujangasana), (12) Dancer's Pose (Natarajasana), and (13) Sun Salutation (Surya Namaskar),^{19,28,106} which benefits the whole body and all of the chakras.

DISCUSSION

The reviewed studies provide evidence that yoga can help couples overcome infertility and improve the ART success rate by reducing anxiety and depression,^{40,107,108} decreasing stress,¹⁰⁷ regulating 8 hormonal secretions, increasing quality of life, and raising fertility rates.^{10,18,19,22,23,104,105,109-111}

Following stress, the endocrinal organ system releases stress-related hormones, such as cortisol and adrenalin.^{15,112} Smith et al¹¹³ showed that the LH hormone levels decreased in female ovaries as a result, and ovulation was disrupted or even paused.

High levels of cortisol have been found to be strongly associated with miscarriage.^{15,112} Studies from the past several decades have demonstrated that high stress levels are strongly correlated to infertility.^{74,114-116} In IVF patients, some studies have shown that the rates of implantation increased when daily adrenalin levels were lower.^{19,114,115} Other studies have shown a similar correlation when measuring cortisol levels.^{19,114,115}

These results indicate that couples with infertility can be more successful at reproduction when they lead less stressful lives.^{117,118} Frederiksen et al¹¹⁹ showed that chronically stressed women produced less of the gonadotropin-releasing hormone, which prevented ovulation by starting a cascade of hormonally related changes. One study showed that women who are very underweight or overweight do not ovulate normally and also have hormonal imbalances.¹²⁰

In men, stress was shown to affect fertility both by lowering sperm volume and by raising the percentage of

abnormal sperm.¹¹⁹ Three studies have found that men who were underweight or overweight had imbalanced levels of testosterone and lower sperm count and concentrations.¹²¹⁻¹²³

Incorporating yoga into a daily routine has been found to be a great way to balance the body in both genders.^{10,104,105,124} Prior et al⁸⁶ found it could be beneficial to do yoga to reduce stress and increase the fertility rate, because cortisol levels can have a significant effect on fertility. From the current review, it is clear that yoga can be used to prevent or reduce obstetric complications⁵³ and improve sexual functions in women.¹²⁵ Researchers have suggested that asanas, pranayama, shavasana, and meditation are related to the cerebrospinal fluid, endocrinal secretion, and the ANS.^{2,104,105,126-128}

CONCLUSIONS

Yoga can help couples experiencing the challenges of infertility by increasing clarity of mind, maintaining homeostasis, and giving them real power while undergoing the therapeutic rigors of ART. When patients recognize the state of their bodies, they can achieve physical relaxation, have a better sense of themselves and begin to treat their problems with more interest and strength. Patients can report to their doctors more easily about the state of their bodies and their sensations in ART cycles. Yoga can also improve fertility rates in ART by diminishing stress and modifying the body's hormonal secretions, ANS, genital health, and sexual arousal. However, these findings should be reconfirmed by future well-designed, randomized clinical studies.

AUTHOR DISCLOSURE STATEMENT

No competing financial interests exist for the authors.

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