

Yoga as the 'Complementary, Holistic, and Integrative Medicine' of Infertility

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Infertility and conception complications have long been major global health concerns¹, and these continue to be significant clinical problems affecting 8% to 10% of couples globally and 7% to 15% of couples in the United States²⁻⁶. Infertility has also been common among the Indian population (4-6%, as per the 1981 census)⁴. In the causation of infertility in a couple, both the male and female factors play vital roles^{7,8}. According to reviews of infertility conducted worldwide by the World Fertility Survey and others, similar patterns of infertility rates were found in several South Asian countries that include 5% in Pakistan, 6% in Nepal, 4% in Bangladesh, and 4% in Sri Lanka^{2,9}.

A 'male factor' is thought to be responsible for approximately 30 % to 40% of all infertility cases^{3,7}. It had been revealed that about three decades ago normal Indian men had sperm count of approximately 60 million/mL which at present has dropped down to about 20 million/mL today¹⁰. Besides quantitative decline of sperm quantity all over the globe, sperm morphology and motility are also gradually deteriorating^{11,12}. Semen quality has deteriorated by more than 2% in the past few years¹³. It has also been reported that in India, 40% of Indian men of reproductive age are experiencing

both quantitative and qualitative decline in semen quality¹⁰. A recent study showed the temporal trend in seminal parameters in Indian men, over a span of 37-years (1979–2016). The study found a declining trend in semen quality over time, with the drop being greater in infertile males than fertile males. Significant ($p < 0.05$ or < 0.001) reductions in sperm concentration and deterioration of sperm morphology were detected in a pooled assessment of all subjects¹⁴.

Among the multiple causatives of male infertility, stress is a crucial factor that has negative impact on the endocrine milieu regulating the reproductive functions¹⁵⁻¹⁷. According to the findings from the University of Copenhagen, environmental pollution is another major factor responsible for a significant decline in seminal quality in men between 1938 and 1991¹⁸. That study confirmed a 28% increase in the number of men who had hypospermia between the 1960s and 1990s, which was previously reported¹⁸. However, the occurrence of amenorrhea is the most common way in which the 'female' factor in infertility can be identified and diagnosed¹⁹. Others include hyperprolactinemia, polycystic ovarian syndrome (PCOS), Mullerian abnormalities (congenital

uterine developmental anomalies), imbalanced hypothalamic and pituitary hormone secretions, obstruction of the cervix, etc.²⁰. According to statistics, about 6.7 million women (10.9%) in the United States of age range 15-44 years, suffer from menstrual abnormalities and other reproductive dysfunctions, and among these, number of married women is about 1.5 million (6% of the total)²¹. On the basis of data from women nearing the end of their reproductive phases, in the age group 45-49 years, it is estimated that the global infertility rate is approximately 10%, with India accounting for 8% of the total, Pakistan accounting for 10% of the total, Sri Lanka accounting for 11%, Nepal accounting for 12%, and Bangladesh accounting for 15% of the total²².

Since the beginning of times, human have practiced various methods to heal and ameliorate their fecundity using rituals, dances, folk medicine, traditional beliefs, and a variety of techniques performed by healers or revered members of cultures²³. In the present times, complementary and alternative medicine/therapy (CAM) is frequently used for the same purpose as traditional medicine/therapy (MT)²⁴⁻²⁶. Because of the high cost of assisted reproductive technologies (ART), a major proportion of infertile couples adopt various CAMs as they believe CAMs are cost-effective, potent and safe ways of fertility treatments²⁷. Herbal medicines, homeopath, spiritual healing, and yoga have been integral part of Indian Medicine for more than 7,000 years. They form the cores of CAMs with proven effectiveness in infertility treatment²⁸. Therapies using yoga have showed high promise in improving both male and female reproductive malaise through overall integration of the physiological systems²⁹. The practice of yoga therapy fine tunes and positively modulates the neuroendocrine axis, which results in beneficial changes³⁰. Stress reduction and neurohormonal balance are the primary mechanisms by which yoga improves reproductive functions³¹. Yoga diminishes the urinary excretion of catecholamines and aldosterone, lowers serum testosterone and luteinizing hormone (LH) levels, and raises cortisol excretion, all of which alleviates stress induced reproductive endocrine dysregulations and ameliorate fertility parameters in women^{31,32}. With yoga therapy, besides decrease in serum cortisol levels, positive changes were observed

in electroencephalogram (EEG) waves (basically an increase in alpha waves) that aids better perception and calmness of mind and body^{33,34}. Pregnant women who practice yoga, meditation, physical postures, and breathing exercises, have been found to have a higher child birth weight, fewer preterm births, and less intrauterine growth restriction (IUGR) than those who do not practice yoga^{35,36}. Women who practiced yoga during second trimester of their pregnancy had substantial decreased physical pain during post-intervention as compared to the baseline. Moreover, women on practicing yoga in pregnancy third trimester showed greatly reduced perceived-stress and anxiety in the post-intervention assessment compared to baseline³⁵. Use of yoga to prevent or diminish obstetric complications is, therefore, unquestionably beneficial³⁷.

Yoga therapy, in addition to aiding in the management of stress, can also help to improve circulation and promote the proper functioning of the internal organs³⁸. Moola bandha has been linked to a reduction in spermatthorrea in men, as well as the prevention of inguinal hernia and the regulation of testosterone secretion³⁰. As a result, the practice of moola bandha can help men become more aware of the genital arousal sensations and also help to improve libido³⁹. Furthermore, as men grow older, synthesis of sex hormones, testosterone, dehydroepiandrosterone (DHEA), and other androgens gradually ceases⁴⁰. Testosterone levels in men are thought to decrease by 1% for every year they spend over the age of forty⁴¹. Men in their sixties have testosterone levels that are significantly lower than they were when they were younger⁴¹. Because testosterone is the main hormone that regulates male reproductive functions, reduction in testosterone levels with ageing or other conditions adversely affect male reproductive functions and sexual behavior. These hormonal secretions are markedly improved with yoga therapy, which does so by improving and integrating neuroendocrine axes⁴². As a result, it increases sexual desire while also improving overall reproductive health³⁰.

This short article thus highlighted that female and male fertility can be improved through the practice of yoga, which reduces stress, which in turn leads to a balanced hormonal milieu as well as improved mental health, thereby increasing the ability of a couple to conceive³⁵. Although there

has been some progress in this field of research, it seems that extensive studies are still needed to pin point the exact effects of yoga on reproduction, emphasizing on the mechanisms and precisely customizing yoga therapies for each kind of fertility disorder. This unexplored territory of scientific research may open the door to a new dimension of scientific inquiry that is an unfailing avenue for achieving holistic reproductive health.

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