Air Pollution and Assisted Reproductive Technology

At the end of autumn, each year, we are used to witnessing unhealthy air due to temperature inversion, especially in large cities. This year, Tehran broke its last year’s inversion record of 42 days by a surpassing 45-day inversion period. Scientist believes the reason for this phenomenon lies in green house effect due to the accumulation of air pollutant such as CO, CO₂, NO₂, SO₂, O₃ and floating particulate matters or aerosols. Increases in the number of days with air-pollution and red alerts in big cities affects all aspects of health especially those of the children, the elderly and pregnant women (1). Numerous studies have been done on the impact of air-pollution on the cardiovascular and pulmonary functions. A number of studies have evaluated the relationship between the impact of air pollution on human and other mammalian reproductive function. Air pollution increase the rate of abortions, low birth weight or increase in the number of anomalies and congenital defects due to maternal exposure to polluted air during pregnancy. Cigarette smoking is a good example in both men and women as it can harm oogenesis, spermatogenesis, sperm and ovum quality leading to intrauterine growth retardation and increased risk of abortion (2). Interestingly, most of these pollutants may be inactivated by the pregnant mother’s physiological systems to effectively minimize fetal exposure to them. Nevertheless, the effects of these pollutants on the health, well-being and growth of embryos have been confirmed in a number of studies. However, in assisted reproductive technologies, embryo is directly exposed to the extraterine environment and has close contact with particulate matters floating in air, where lack of defense mechanisms in the embryo and absence of maternal protective mechanisms increase embryo vulnerability to environmental hazards, especially to air pollutants (3). Moreover, the limited number of studies in this area is indicative of the harmful effects of air pollutants on embryos development and success rate of assisted reproductive technologies. Studies on the volatile organic compounds (VOC) such as anesthetic gases or in CO₂ containers severely affect the result of in vitro fertilizations (IVF), including the quality of embryos, pregnancy and live birth rates. In a recent study, the impact of other air pollutants on the results of assisted reproductive technologies has been evaluated. The study has examined 7403 IVF cycles in three separate infertility treatment centers or IVF labs over a period of 7 years (4). The researchers simultaneously estimated the daily concentration of pollutants at each corresponding IVF lab. The results showed that a moderate exposure to air pollution is correspond to at least an increase of 1-2 years in the

References