



The Impact of Lifestyle, Diet, and Psychological Stress on Female Fertility

Salvatore Giovanni Vitale¹, Valentina Lucia La Rosa^{2*}, Beatrice Petrosino³, Alessandro Rodolico³, Ludovico Mineo³ and Antonio Simone Laganà¹

¹Unit of Gynecology and Obstetrics, Department of Human Pathology in Adulthood and Childhood "G. Barresi", University of Messina, Messina, Italy

²Unit of Psychodiagnostics and Clinical Psychology, University of Catania, Catania, Italy

³Unit of Psychiatry, Department of Clinical and Experimental Medicine, University of Catania, Catania, Italy

ARTICLE INFO

Article history:

Received: 17 May 2017

Accepted: 6 June 2017

Online:

DOI 10.5001/omj.2017.85

Infertility is defined by a couple's inability or failure to conceive after regular unprotected sexual intercourse for six months for women over the age of 35, or 12 months for women under the age of 35.¹ Infertility is due to male causes in 35% of cases and to combined causes in 15% of cases.¹ It can be the result of several conditions (including gynecological cancer^{2,3} and endometriosis⁴) as well as environmental and lifestyle factors.

The impact that exposure to environmental factors can have on fertility is still unknown; however, the literature suggests that it may contribute to a significant reduction of fertility.⁵

Psychological stress is considered part of the environmental factors adversely influencing fertility. Indeed, there is a clear evidence that infertility is a chronic experience of stress associated with a number of adverse health effects.¹ Specifically, the hypothalamus-pituitary-adrenal axis plays a pivotal role in mediating neuroendocrine effects. It is responsible for the secretion of cortisol, also known as "stress hormone" as its production increases in chronic stress conditions.⁵ Therefore, several studies have underlined a possible relationship between high levels of perceived stress and higher levels of cortisol, and infertility.⁵

Studies have also investigated the impact of lifestyle factors on fertility outcomes. Several studies have underlined the effects of smoking, alcohol and caffeine consumption, diet, and exposure to electromagnetic fields on women's reproductive parameters.^{6,7} Cigarette smoke contains many toxic constituents known to be mutagens and carcinogens, such as cotinine and benzo[a]pyrene.⁶ Many studies

confirmed the negative impact of smoking on fertility and all reproductive parameters, including follicle development/ovulation, oocyte retrieval from the ovary and its transport down the Fallopian tubes, and fertilization and early embryo development. Currently, it is generally accepted that smoking cessation should be an integral part of any infertility treatment.⁶ Moreover, since cigarette smoking has adverse effects on fertility, it is reasonable to assume that it may have deleterious effects on Assisted Reproduction Technology (ART) outcomes, as shown in the literature.⁵

Alcohol consumption in women is associated with a decrease in fertility and reduced likelihood of conception.^{5,6} However, the literature about the impact of alcohol consumption on reproductive parameters during ART is controversial, and it is not possible to establish a direct correlation.

Studies on the impact of caffeine consumption on fertility are limited. The consumption of caffeine could affect ovulation causing alterations in hormone levels; in particular, caffeine reduces plasma levels of prolactin in healthy nonpregnant women and can inhibit ovulation or the function of the corpus luteum.^{5,7} Literature on the relationship between diet and fertility is also limited. However, fertility levels are lower among overweight women,^{5,6} and women with a higher energy intake from unsaturated fat instead of carbohydrates have a 73% increased risk of infertility.⁶ Vitamins and antioxidants are the most important nutritional and dietary factors commonly studied in female fertility. A study by Ruder et al,⁸ showed an association between increased intake of vitamin C and a shorter conception time. However,

this effect was observed only among women with a body mass index > 25 kg/m², and in women over the age of 35.⁸ Moreover, several studies underlined the important influence of vitamin D on female fertility parameters.⁹ Finally, although available data are limited, fruit and vegetable consumption seems to be associated with an improvement of reproductive parameters during ART.⁶

The use of mobile phones and wireless networks has become an integral part of our lives. In particular, the development of smartphones and 3G internet technology has led to an increased exposure to radio frequency electromagnetic fields. Data about this topic are not robust and a clear correlation has not been established between the use of cell phones and wireless networks and fertility parameters.¹⁰

In conclusion, literature confirms the importance of environmental factors in influencing female fertility. As available data is still limited, further studies about this topic are needed in order to take appropriate measures for prevention and treatment of infertility.

Disclosure

The authors declared no conflicts of interest.

REFERENCES

1. Vitale SG, La Rosa VL, Rapisarda AM, Laganà AS. Psychology of infertility and assisted reproductive treatment: the Italian situation. *J Psychosom Obstet Gynaecol* 2017 Mar;38(1):1-3.
2. Laganà AS, La Rosa VL, Rapisarda AM, Platania A, Vitale SG. Psychological impact of fertility preservation techniques in women with gynaecological cancer. *Ecancermedicalscience* 2017 Feb;11:ed62.
3. Vitale SG, La Rosa VL, Rapisarda AM, Laganà AS. Comment on: "The consequences of gynaecological cancer in patients and their partners from the sexual and psychological perspective". *Prz Menopauzalny* 2016 Nov;15(3):186-187.
4. Vitale SG, La Rosa VL, Rapisarda AM, Laganà AS. Endometriosis and infertility: the impact on quality of life and mental health. *JEPPD* 2017;9(2): 112-115.
5. Klonoff-Cohen H. Female and male lifestyle habits and IVF: what is known and unknown. *Hum Reprod Update* 2005 Mar-Apr;11(2):179-203.
6. Firns S, Cruzat VF, Keane KN, Joesbury KA, Lee AH, Newsholme P, et al. The effect of cigarette smoking, alcohol consumption and fruit and vegetable consumption on IVF outcomes: a review and presentation of original data. *Reprod Biol Endocrinol* 2015 Dec;13:134.
7. Bolúmar F, Olsen J, Rebagliato M, Bisanti L; European Study Group on Infertility Subfecundity. Caffeine intake and delayed conception: a European multicenter study on infertility and subfecundity. *Am J Epidemiol* 1997 Feb;145(4):324-334.
8. Ruder EH, Hartman TJ, Reindollar RH, Goldman MB. Female dietary antioxidant intake and time to pregnancy among couples treated for unexplained infertility. *Fertil Steril* 2014 Mar;101(3):759-766.
9. Colonese F, La Rosa VL, Laganà AS, Vitale SG, Cortinovis D, Bidoli P. Comment on: "Is there a role for vitamin D in human reproduction?". *Horm Mol Biol Clin Investig* 2017 Jan;29(1):37-38.
10. Nazıroğlu M, Yüksel M, Köse SA, Özkaya MO. Recent reports of Wi-Fi and mobile phone-induced radiation on oxidative stress and reproductive signaling pathways in females and males. *J Membr Biol* 2013 Dec;246(12):869-875.