INDIAN FERTILITY SOCIETY

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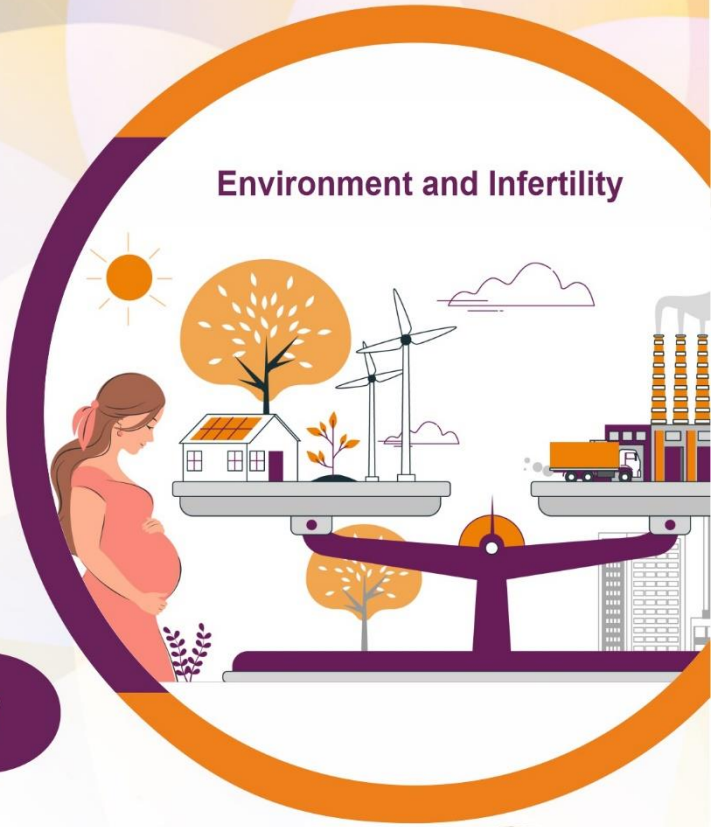

Environment and Infertility

Dr Prof (Col) Pankaj Talwar, VSM, MD, PhD.
President, IFS

Dr (Prof) Shweta Mittal Gupta, MD, DNB, FNB, MNAMS
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Abstract

The advanced developments in industries and high-tech appliances resulted in environmental toxins leading to decrease in fertility worldwide[1]. The research shows that the metals and chemicals in air, water, food, and health-and-beauty aids have adverse effects on male and female fertility. Endocrine disruption is one of mechanisms explained for this slump in infertility.[2] The clinicians have observed there is decreasing sperm count in men and women are suffering progressively decrease in ovarian reserve, anovulation, impaired implantation, and loss of foetal viability.

Introduction

In the current era, modernization, industrial developments and human greed had affected environment a lot. And the environment in which we live has a significant impact on our health as well as fertility. Since many decades the research has shown that exposure to certain environmental factors can have adverse effects on reproductive health. Endocrine system disturbance favours the development of obesity leading to infertility[1]. And so human fertility is declining worldwide. This damage causing decrease in natural fertility as well as affecting results of IVF (In Vitro Fertilization)[3]. Large proportions (up to 40%) of young men in some countries have low semen quality, which reduces their ability to father children[2]. The incidence of genital malformations, such as non-descending testes (cryptorchidisms) and penile malformations (hypospadias), in baby boys has increased over time or levelled off at unfavourably high rates[2].

The Second National Report on Human Exposure to Environmental Chemicals provides for the US population serum, blood and urine levels for 116 environmental chemicals over the years 1999 and 2000, with separate analyses by age, sex, and race/ethnicity[4]

Common environmental factors that can impact fertility

1- Air pollution: Exposure to air pollution has been linked to a range of reproductive problems, including decreased sperm quality and quantity, and an increased risk of infertility and miscarriage. Most common cause appears to be toxin exposure due tobacco use in the air. Research shows that women smoking more than 10 cigarettes daily have reduced fertility [5]. Tobacco smoke contains many toxic materials and chemicals and hazardous to men and female reproductive system.[4] Smoking also has other adverse effects like higher rates of ectopic pregnancies and spontaneous abortions, stillbirths and infant mortality. It also causes decreased sperm count, as well as affecting motility and density in men. In India rural and tribal part of India use tendu patta for bidi smoking. Our unpublished study in 2023 observed 56% of semen samples were showing oligospermia and asthenospermia.

We need to understand effects of passive smoking also. Women residing near highway there is higher rate of infertility. Vehicular exhaust is associated with enough amount of air pollutants which causes reduced fertility in males as well. Vehicular exhaust, containing pollutants like PM2.5, nitrogen oxides, and volatile organic compounds, can negatively impact fertility in both men and women.[6] Men residing in an industrial town suffered significant reduction in sperm motility and morphology and higher levels of sperm with abnormal chromatin when compared with those living in a rural district with little air pollution. In 2017, three large Chinese sperm banks reported steep declines in semen quality from their donors, who predominantly live in cities that are highly polluted as a side-effect of economic upturn[19]. The excessive consumption of fuels associated with rapid industrialization, urbanization and modernization has caused serious smog events in many Chinese cities. Vehicle exhaust is one of the primary causes of smog events due to the rapid growth of motor vehicle ownership and increased fuel consumption [7].

2- Water contamination: Exposure to contaminants like lead, mercury, and arsenic can impact fertility by interfering with hormone levels and causing reproductive problems. Women drinking groundwater with tetrachloroethylene (PCE) contamination suffer over a doubled risk of spontaneous abortion as well as increased risk for breast cancer [22]. With chlorinated water there is risk of stillbirth or delivered baby can have smaller body length and smaller head circumference [8].

3-Pesticides: Exposure to pesticides has been linked to an increased risk of infertility, as well as other reproductive problems like miscarriage and birth defects. Men who had consumption of high pesticide-residue fruit and vegetables, suffered with 49% lower total sperm count and morphologically normal sperm percentage was 32% [9] Non-descended testes in young boys are linked with exposure to diethylstilbestrol (DES) and polybrominated diphenyl ethers (PBDEs) and with occupational pesticide exposure during pregnancy[2]. It is observed that, as a woman's blood levels of

hexachlorocyclohexane, polychlorinated biphenyls (PCBs) and chlorodiphenyltrichloroethane (DDT) increase, their fertility goes down [10]. There are potential effects of female exposure to nonpersistent EDCs, specifically bisphenol A (BPA), phthalates, parabens, and triclosan, on fecundity. It caused decrease in markers of reproductive hormones, markers of ovulation or ovarian reserve affecting IVF outcomes[16- 20]. In women with highest levels of PCB there is 50% decrease in ability to get pregnant and if they conceive there are chances of miscarriage [11]. High accidental exposures to PCBs during fetal development or to dioxins in childhood increase the risk of reduced semen quality in adulthood[2].

4- Radiation: Exposure to high levels of radiation can damage reproductive organs and impair fertility. Radiation exposure, particularly ionizing radiation from sources like medical treatments or environmental pollution, can significantly impact fertility in both men and women. It can damage reproductive cells and organs, leading to temporary or permanent infertility [12].

5- Lifestyle factors: Factors like diet, exercise, and smoking can also impact fertility. Poor diet and lack of exercise can contribute to obesity, which is a risk factor for infertility. Smoking has been linked to decreased fertility in both men and women.

How the human reproductive health is deteriorating due to environmental toxins

Environmental toxins cause infertility in basically in 4 ways:

- Endocrine disruption.
- Damage to the female reproductive system.
- Damage to the male reproductive system.
- Impaired foetal viability.

A severe decline in child births has occurred over the past half century, which is alarming to considerable population declines, particularly in industrialized regions.[13] Studies show that there is widespread infertility and the need for assisted reproduction due to poor semen quality and/or oocyte failure are now major health issues. Other indicators of declining reproductive health include a worldwide increasing incidence in testicular cancer among young men and alterations in twinning frequency. The worst fertility disrupters are organochlorine compounds (chlorinated pesticides, polychlorinated biphenyls, and dioxins), bisphenol A (BPA), and organophosphate pesticides and herbicides. However, many other chemicals, metals, and air pollutants seriously damage fertility. [14]

Endocrine Disruption

The research revealed that the key endocrine disruption which damages fertility is loss of blood-sugar control. It has a direct effect leading to metabolic syndrome and diabetes and causing indirect effect leading to abdominal obesity in men and women with polycystic ovary syndrome (PCOS) in females.

Bisphenol is used to produce plastic polymers and used in barrier coatings for the inner surfaces of food and beverage cans. It is endocrinal disruptor and causes male infertility. In females, it produces insulin resistance leading to polycystic ovarian syndrome [15]. Lead used in batteries, paints, ceramics, pipes. Mercury used in thermometers, batteries. Boron in glass, cement, soaps. All these metals interrupt hypothalamic–pituitary axis causing subfertility [16].

Effects of endocrinal disruption-

PCOS is the current burning issue of the world. In men with type 2 diabetes, a remarkable 33% suffer hypogonadism. Women with PCOS have substantially lower fertility and if they become pregnant have increased risk of pregnancy complications like gestational diabetes (GDM), pregnancy induced hypertension (PIH). These women also have potential for early pregnancy loss. PCOS has impact on baby's health. The incidence of adverse pregnancy outcomes, such as preterm birth and low birth weight, has increased in many countries[2]. PCOS women have tendency for preterm delivery so these

women may be more likely to have babies who are small for gestational age requiring neonatal intensive care with morbidity and mortality.[17] Many endocrine-related diseases and disorders are on the rise[2].

How to reduce exposure to environmental factors that can impact fertility

Follow the healthy Key= Life-style management and self-protection and understanding the environmental factors which diminish fertility have very important role in our life.

- **Diet:** Eating a healthy diet rich in fruits, vegetables, and whole grains can help reduce your risk of obesity, which is a risk factor for infertility [18]. Addition of micronutrients, homemade food improve fertility.
- **Meditation and Exercise:** Meditation build up healthy mind. Regular exercise more than 45minutes can help you to maintain a healthy weight and reduce your risk of health problems that can impact fertility.
- **Minimise exposure to toxins and pollutants:** Always be alert and mindful regarding your exposure to pesticides (especially factory workers, farmers), toxins and pollutants like lead, mercury, the persons who work near furnaces. Use natural cleaning products and avoid using pesticides in your home and garden.
- **Quit Addictions:** Smoking has been linked to decreased fertility in both men and women.

Remember-

- Decreasing fertility rates were already recorded around 1900 in Denmark[21], a few decades after the beginning of utilization of fossil fuels that were, and still are, drivers of modern industrialization and wealth.
- According to a study conducted by the Indian Council of Medical Research, India is home to 15 of the 20 most polluted cities in the world, and 3 out of 4 Indians breathe toxic air. This study found that by simply breathing clean air, the average Indian could live 1.7 years longer. The World Health Organization has also reported that around 91% of premature deaths linked to air pollution occur in low- and middle-income countries[18].

Conclusion

Fertility is a complex and multifaceted issue, and environmental factors can play a significant role in reproductive health. From pollution and pesticides to climate change and lifestyle factors, the environment can impact fertility in a variety of ways. The long-term planning of the development of our urban complex and industries and its effect on the environment to be noted. It should be studied properly if the technological innovations are to keep pace with the demands of an ever-increasing population. Indirectly it will help in improving fertility of couple. By taking steps to reduce your exposure to toxins and pollutants, maintaining a healthy lifestyle, and getting tested if you suspect that you may have been exposed to environmental factors, you can improve your chances of conceiving and having a healthy pregnancy.

References-

1 Review Article-AMERICA'S OBESITY: Conflicting Public Policies, Industrial Economic Development, and Unintended Human Consequences; James E. Tillotson[1] Vol. 24:617-643 (Volume publication date July 2004) First published as a Review in Advance on March 25, 2004

2 The Impact of Endocrine Disruption: A Consensus Statement on the State of the Science, 1 April 2013; Authors: Åke Bergman, Jerrold J. Heindel, Tim Kasten, Karen,
A. Kidd, Susan Jobling, Maria Neira, R. Thomas Zoeller, and Tracey,
J. WoodruffAuthors;Publication: Environmental Health Perspectives, Volume 121, Issue 4
Pages a104 - a106

3 Are we overusing IVF? *BMJ* 2014; 348 doi: https://doi.org/10.1136/bmj.g252 (Published 28 January 2014)Cite this as: *BMJ* 2014;348:g252; *Esme I Kamphuis, PhD student1, S Bhattacharya, professor2, F van der Veen, professor1, B W J Mol, professor 3,A Templeton, professor emeritus 2for the Evidence Based IVF Group*

4- Postgrad Med . Author manuscript; available in PMC: 2016 Apr 1.*Published in final edited form as:* Postgrad Med. 2015 Feb 19;127(3):338–341. The Effects of Cigarette Smoking on Male Fertility Jason R Kovac [1], Abhinav Khanna [2], Larry I Lipshultz [2]

5- Storgaard L, Bonde JP, Ernst E, et al. Does smoking during pregnancy affect sons' sperm counts? Epidemiology. 2003;14(3):278–278. [PubMed] [Google Scholar

6- J Proteome Res. . 2015 Jan 2;14(1):22-37. doi: 10.1021/pr500939c. Epub 2014 Nov 3. Effects of motor vehicle exhaust on male reproductive function and associated proteins Deivendran Rengaraj [1], Woo-Sung Kwon, Myung-Geol Pang

7 Science of The Total Environment, Volume 668, 10 June 2019, Pages 245-253; Fault tree analysis of the causes of urban smog events associated with vehicle exhaust emissions: A case study in Jinan, China;panelFengchuan Wang [a], Peiming Zheng [a], Jiulan Dai [a b], Hui Wang [a], Renqing Wang [a b]

8 - Kanitz S, Franco Y, Patrone V, et al. Association between drinking water disinfection and somatic parameters at birth. *Environ Health Perspect*. 1996;104(5):516-520.

9 Chiu YH, Afeiche MC, Gaskins AJ, et al. Fruit and vegetable intake and their pesticide residues in relation to semen quality among men from a fertility clinic. *Hum Reprod*. 2015;30(6):1342-1351.

10 - Gerhard I, Mongo B, Krahe J, Runnebaum B. Chlorinated hydrocarbons in infertile women. *Environ Res Sect A*. 1999;80:299-310.

11 - Chevrier C, Warembourg C, Gaudreau E, et al. Organochlorine pesticides, polychlorinated biphenyls, seafood consumption, and time-to-pregnancy. *Epidemiology*. 2013;24(2):251-260.

12 Reprod Biol Endocrinol, . 2018 Dec 9;16:118. doi: 10.1186/s12958-018-0431-1 Radiations and male fertility: Kavindra Kumar Kesari [1], Ashok Agarwal [2,✉], Ralf Henkel [3]

13 Review Article, Published: 15 December 2021,Environmental factors in declining human fertility;Niels E. Skakkebæk, Rune Lindahl-Jacobsen, Hagai Levine, Anna-Maria Andersson, Niels Jørgensen, Katharina M. Main,Øjvind Lidegaard, Lærke Priskorn, Stine A. Holmboe, Elvira V. Bräuner, Kristian Almstrup, Luiz R. Franca, Ariana Znaor, Andreas Kortenkamp, Roger J. art & Anders Juul *Nature Reviews Endocrinology* volume 18, pages139–157 (2022)

14 Environmental Toxins and Infertility; *Joseph Pizzorno, ND, Editor in Chief*

15 -- Oocyte ageing and epigenetics in Reproduction; Authors: Zhao-Jia Ge,Heide Schatten, Cui-Lian Zhang, and Qing-Yuan Sun, Correspondence should be addressed to C-L Zhang;
Email: zcl6086@gmail.com or to Q-Y Sun; Email: sunqy@ioz.ac.cn Volume/Issue: Volume 149: Issue 3 3Page Range: R103–R114, Article Type: Review Article Copyright:© 2015 Society for Reproduction

and Fertility 2015 Online Publication Date: Mar 2015, Open access

16 - Fertility, mortality, migration, and population scenarios for 195 countries and territories from 2017 to 2100: a forecasting analysis for the Global Burden of Disease Study, Stein Emil Vollset [1], Emily Goren [2], Chun-Wei Yuan [2], Jackie Cao [2], Amanda E Smith [2], Thomas Hsiao [2], Catherine Bisignano [2], Gulrez S Azhar [2], Emma Castro [2], Julian Chalek [2], Andrew J Dolgert [2], Tahvi Frank [2], Kai Fukutaki [2], Simon I Hay [1], Rafael Lozano [1], Ali H Mokdad [1], Vishnu Nandakumar [2], Maxwell Pierce [2], Martin Pletcher [2], Toshana Robalik [2], Krista M Steuben [2], Han Yong Wunrow [2], Bianca S Zlavog [2], Christopher J L Murray [3]

17 Diabetes Spectr, . 2015 May;28(2):116–120. The Role of Polycystic Ovary Syndrome in Reproductive and Metabolic Health: Overview and Approaches for Treatment, Carrie C Dennett [1], Judy Simon [2,3,]

18 WHO Report: https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-
ealth#:~:text=Some%2091%25%20of%20those%20premature,Asia%20and%20Western%20Pacific%20regions

19- Volume 393, Issue 10180p1500-1501April 13, 2019 Populations, decreasing fertility, and reproductive health: Niels E Skakkebaek[a] nes@rh.dk · Niels Jørgensen[a] · Anna-Maria Andersson[a] · Anders Juul[a] · Katharina M Main[a] · Tina Kold Jensen[a]

20 Curr Opin Obstet Gynecol, . 2017 Aug;29(4):202-211. Female exposure to endocrine disrupting chemicals and fecundity: a review Lidia Mínguez-Alarcón [1], Audrey J Gaskins How can smoking impact my ability to conceive? ReproductiveFacts.org

21 Proceedings of the National Academy of Sciences; Vol. 67, No. 2, pp. 887-897, October 1970 A Lesson from the Smog Capital of the World, Ai J. Haagen-Smit, STATE OF CALIFORNIA, AIR RESOURCES BOARD, SACRAMENTO, CALIFORNIA 95814, AND CALIFORNIA INSTITUTE OF TECHNOLOGY, PASADENA, CALIFORNIA 91109, Contributed to Symposium on Aids and Threats to Society from Technology, April 29, 1970

22 Jennifer R. Gruhn, Jennifer R. Gruhn, Vallari Shukla, Robert Blanshard, Antonio Capalbo, Danilo Cimadomo, Dmitry Nikiforov , Andrew Chi-Ho Chan, Louise J. Newnham and Eva R. Hoffmann; *Science,* 27 Sep 2019, Vol 365, Issue 6460

13 pp. 1466-1469

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Flat No. 302, 3rd Floor, Kailash Building
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