

# CHAPTER-17

## INFERTILITY AND ENVIRONMENTAL FACTORS

**Dr. P. GOURISANKAR**

Professor and HOD, Department of Kayachikitsa  
Glocal College of Ayurvedic Medical Sciences and Research Centre  
Glocal University, Saharanpur, U P, India

**DOI:** <https://doi.org/10.52458/9788196830069.nsp.2024.eb.ch-17>

**Ch.Id:-GU/NSP/EB/GHTAGA/2024/Ch-17**

## **ABSTRACT**

*Air pollution is a significant environmental factor that is linked with reduced fertility rates. Volatile Organic Compounds, particulate matter, and heavy metals found in polluted air have been shown to negatively affect sperm quality, ovulation, and embryo implantation. To mitigate the impact of environmental factors on infertility, policymakers, healthcare providers, and individuals must take proactive measures. These may include stricter regulations on EDCs, improved air quality standards, and public health campaigns promoting healthier lifestyles. Moreover, couples facing infertility should consider seeking medical advice and guidance to address both environmental and genetic factors. Infertility is influenced by a complex interplay of genetic, lifestyle, and environmental factors. Recognizing the significance of environmental factors is essential in understanding and addressing the rising infertility rates globally. Collaborative efforts are needed to minimize exposure to harmful environmental agents and support individuals and couples in their journey toward parenthood.*

**Keywords:** *Infertility Failure to achieve conception, Life style - style of life, endocrine-disrupting chemicals - chemicals disturbing the endocrine glands.*

## **1. INTRODUCTION**

Infertility is the condition of failure to achieve conception even after one or more years of regular unprotected coitus during reproductive period. It is one of the most common gynaecological problems during reproductive period.

Infertility is directly related to the health of the organs of the female reproductive system. Infertility can either be primary or secondary<sup>1</sup>.

Primary – the condition in which the couples who never conceived after 1 or 2 years of regular unprotected coitus. Secondary – the condition in which the couples fail to conceive following a previous pregnancy.

Infertility is commonly an increasing problem now a days. Causes of infertility or reproductive problems include various types of diseases and aging. Male infertility is as common as female infertility. Infertility cases may be due to stress, eating disorders, lack of exercise or intense exercise and exposure to environmental toxins. Endometriosis and PCOS greatly contribute to a reduced ability for women to become pregnant.

In Ayurveda vandhyatwa is the term used for infertility. Susruthacharya described vandhya is one of the yoniroga in which the woman lost her arthava. The word arthava is used for two conditions. Bahirarthava (menstruation), and anthararthava (ovulation). Here vandhya refers to infertility due to anovulation.

In Hareetha Samhitha vandyā is classified into the following types<sup>2</sup>

- **Kakavandhya:** a woman does not conceive after giving birth to one child (secondary infertility)
- **Anapathya:** a woman who never conceives (primary infertility)
- **Garbhasravi:** a lady who suffers from habitual abortions
- **Matamatas:** a woman who repeatedly give birth to still babies.
- **Balakshaya:** infertility due to dhathukshaya
- **Garbhakosa Bhanga:** trauma to the genital tract.

## **2. ENVIRONMENTAL FACTORS**

The ability to conceive may be affected by exposure to various toxins or chemicals in the work place or surrounding environment<sup>3</sup>. Exposure to chemicals such as nitrous oxide, glycol ethers, organic solvents, soil fumigants, pesticides, arsenic, and endocrine disruptors such as dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyls (PCBs), and dioxins affect and reduce the sperm count and quality deleteriously there by leading to infertility<sup>4</sup>. Several occupations can be termed as high risk and it will affect male and female reproductive system in various ways. Most people in their day-to-day activities are exposed to a variety of low level hazards. These hazards may or may not cause adverse health effects.

Bisphenol A is an industrially important chemical that is being used for the production of certain plastics and epoxy resins. BPA based plastic is clear and tough and is used to make, food cans, water bottles sports equipment's, CDs, DVDs<sup>5</sup>. Epoxy resins containing BPA are used to line water pipes, as coatings on the inside of many food and beverage cans and in making thermal paper that is used to print receipts. Its properties are like estrogenic hormone and is a known endocrine disruptor and is acutely toxic to aquatic organisms. When it binds to estrogenic receptors it triggers alternative estrogenic effect.

The major human exposure to BPA is diet including ingestion of contaminated food and water. BPA is migrated from the lining of food and beverage cans into food. It especially migrates from plastics when they contain acidic material or high temperature liquids. In the working place, while handling manufacturing products which contain BPA, inhalation and dermal exposures are the probable routes. For women undergoing infertility treatments, research indicates that exposure to bisphenol-A, might greatly

impair their chances of having a baby. Some researchers showed that there is a connection between increased serum levels of bisphenol A and PCOS. It is suspected that the hormonal activity of PBA disrupts the normal hormones of the body - resulting in increased androgen development present in those with PCOS. Maternal exposure during pregnancy may be leading to the dramatic rise in this reproductive disorder in daughters. Due to intensified usage of these products, exposure to BPA through environment and food has increased.

Exposure to lead sources has negative impact on infertility by producing teratozoospermia. Certain polychlorinated biphenyl's (PCBS) have a biological toxicity and can impair the functions of reproductive system. PCBS will persist in the air, water and soil. It has accumulated in fatty tissue in fish, fowls, and mammals. As a result, human exposure to PCBS occurs mainly consuming animal products and dairy foods.

Nonstick pans may be convenient for cleaning, but not for conceiving. The nonstick coating contains the chemical perfluorooctanoic acid (PFOA), which has been linked to reproductive problems.

### **3. TOXINS IN THE WORK PLACE**

- **Dry Cleaning Persons** - Methylene chloride is used as solvent in cleaning and some researches showed that there is increased chance of infertility among exposed people.
- **Medical Workers** - Ethylene oxide is used both in the sterilization of surgical instruments and in the manufacturing of certain pesticides. Exposure to ethylene oxide may cause birth defects and miscarriage.
- **X-Ray Technicians** - Repeated exposure to radiation affects sperm production and ovarian function
- **Agricultural Workers** - Pesticides, herbicides, fungicides cause infertility and miscarriage
- **Forestry Workers** - Pesticides and chlorinated hydrocarbons infertility, decreased sperm count, ovarian problems
- **Factory Workers** -Numerous chemical and heavy metal exposures infertility and miscarriage.
- **Pottery Workers** - Exposure to lead may produce teratospermia there by producing infertility, miscarriages and stillbirths.

- **Battery Makers, Welders** - Exposure to lead and mercury vapours produce infertility, miscarriage, developmental disorders
- **Home Remodelers, Painters** - Toluene used as solvent in paints, glues and varnish are harmful to the reproductive system.

#### **4. PURIFICATION OF BODY TO ELIMINATE TOXINS**

Ayurveda gives infertile couples the ability to become fertile through various therapies. The first step for a successful pregnancy is purification of body. Panchpanchakarma therapy is best for the purification of the body, strengthening the immune system restoring the normal function of reproductive organs. It helps to increase agni and eliminate ama from the body. To remove all kinds of imbalances in the sperm and ova, therapies such as snehapana, swedana, vamana, virechana, vasthi, are highly recommended. Utharavasthi with medicated oils is helpful to strengthen the genital organs. All these treatments improve the strength and quality and sperm and ova. This facilitate conception and implantation of the embryo and have continued benefits to ensure a smooth pregnancy and good health for the child to be born.

#### **5. PREVENTION**

- Stop drinking bottled water
- Avoid plastics made with BPA
- Avoid heating food in plastic containers
- Avoid vinyl (PVC) shower curtains
- Store food in containers made of glass, ceramic, or food safe metal
- Avoid pesticides & use organic food
- Protect and encourage sperm & ovum quality by diet, exercise and medicines

#### **6. CONCLUSION**

Infertility and miscarriage are commonly an increasing problem, both men and women contribute to infertility. Women need functioning ovaries, fallopian tubes and uterus to get pregnant. Conditions affecting any one of these organs causes infertility. In men it can be caused by different factors of sperm such as number, motility and morphology. Hormonal balance of sexual hormones in particular is an important factor in maintaining fertility and regulating reproductive processes. Exogenous substances such as environmental endocrine disruptors may disturb the normal endocrine

mechanism causes hormonal imbalance and causes infertility. Ayurveda explains preconception care and can treat infertility successfully using various methods and medicines. A healthy child is believed in part to be the result of a balanced dosha in aspiring parents.

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