Physical agents interfering with fertility and its toxic effects on human.

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The effects of occupational exposure on men and women's reproductive systems can manifest as changes in sex hormone levels, decreased libido and potency, menstrual disorders, premature menopause, delayed menarche, ovarian dysfunction, impaired sperm quality, and reduced male and female fertility. Toxic exposure can directly cause cell damage in developing sperm and eggs. Maternal exposure during pregnancy may disrupt foetal development by interfering with maternal, placental, or foetal membrane functions directly or indirectly. Toxic exposure can cause a wide range of effects, including foetal death, intrauterine growth retardation, preterm birth, birth defect, postnatal death, cognitive development disruptions, changes in immunological sensitivity, and childhood cancer. The mother's exposure to chemicals at work may also contaminate her breast milk.

Adverse effects on reproduction and development are frequently the result of exposure during the brief, vulnerable periods of ovulation, sperm maturation, and organ formation within the embryo [1]. Some effects may not be visible for years. Lead, for example, may slowly accumulate in maternal tissue before being released during pregnancy or lactation. Some toxins, such as antineoplastic agents, have been shown to reduce the number of female germ cells, resulting in a shorter reproductive life span. Chemical exposure in both men and women can result in chromosomal abnormalities or gene mutations in their children. Different exposure times, durations, and doses may result in different outcomes. If exposure occurs during the first trimester of pregnancy, the most common outcomes are miscarriage or birth defects [2]. Exposure later in pregnancy is more likely to shorten gestation, reduce birth weight, and affect brain development. A lower toxicant dose may result in birth defects, whereas a higher dose may result in miscarriage or infertility. Some chemicals with hormonal activity, known as endocrine disrupters, may alter the function of the endocrine system, resulting in adverse reproductive effects such as poor sperm quality and damaged reproductive tissues in men and some gynaecological medical conditions in women.

There is some evidence that pesticide exposure can reduce female fertility, but the results are mixed. Pesticide exposure may also increase the likelihood of birth defects, miscarriage, or foetal death. In most studies, the risk could not be linked to a specific pesticide [3]. Exposure to biologically persistent chlorinated hydrocarbons, on the other hand, has been linked to miscarriage. Pesticide occupational exposure during pregnancy appears to increase the risk of childhood leukaemia. Carbon monoxide exposure can occur during welding, iron and steel foundries, the food industry, and smoking procedures, as well as in car repair and service stations where car exhaust gases may be present. Carbon monoxide is transported across the placenta, and levels in the foetus can exceed those in the mother's blood [4]. There have been reports of premature birth, intrauterine deaths, and brain injuries in infants linked to maternal carbon monoxide intoxication. Endocrine disruptors are another class of substances that have received a lot of attention as potentially harmful to reproduction. Endocrine disruptors alter hormone production and their interactions with receptors. Estrogenic, anti-estrogenic, androgenic, or anti-androgenic endocrine disruptors are the four types of endocrine disruptors. Pharmaceutical compounds and environmental compounds are included in each category.

Cadmium is a heavy metal that is used in jewellery making, electronics, welding, and steel galvanising. Human exposure is primarily inhalational or oral; environmental exposure among non-occupationally exposed individuals can occur as a result of cigarette smoking. Oral exposure can occur from ingesting plants and shellfish that have absorbed cadmium from water and soil [5]. Cadmium exposure reduces male fertility by lowering spermatogenesis, sperm quality, sperm motility, and impairing hormonal synthesis. Similarly, cadmium exposure reduces female fertility in terms of menstrual cycle regularity and reproductive hormonal balance. Lead, a heavy metal that can exist in both organic and inorganic forms, has been linked to decreased male libido, erectile dysfunction, premature ejaculation, and poor sperm quality. Lead is thought to primarily affect male reproduction by disrupting hormones, which reduces sperm production in the seminiferous tubules.

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