

SUBFERTILITY, FACTORS CAUSING DISRUPTION OF NORMAL FERTILIZATION

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Annotation. A delay in conception is one of the most common reasons that a woman will consult their doctor. The most common accepted definition for subfertility is failure to conceive after 12 months of regular unprotected intercourse. The incidence of subfertility is thought to be one in seven heterosexual couples.

Keywords: pregnancy, fertility, ovulation, endometriosis, polycystic ovary syndrome (PCOS).

A healthy couple having regular intercourse have a 15-20% chance of conceiving in a single menstrual cycle. As a species this makes our reproduction relatively inefficient. There is of course a cumulative increase in pregnancy rates over time as couples try to conceive. Within 6 months, 70% of couples will have conceived; after 12 months, 80% of couples will have conceived; and, by 24 months, 90% of couples will achieve a pregnancy. The most important factor affecting fertility is female age, which is related to a decline in the quality and quantity of eggs. Female fertility falls sharply after 35 years of age, with a further dip after 40. However, there is considerable variation, and biological age (or ovarian reserve) does not always correlate with chronological age. Male age is also important; semen quality falls in men over the age of 50.

Both frequency and timing of sexual intercourse have a strong impact on conception rates. Couples having intercourse three times a week are three times more likely to conceive than those having intercourse once a week. Maximum 'efficiency' is probably intercourse at least two to three times per week outside menstruation. There should, however, be awareness among physicians and patients of the added stress and anxiety that 'over-medicalizing' this advice can bring to couples. Increased frequency of intercourse should be encouraged in the periovulatory period. Eggs are thought to be fertilizable for about 12-24 hours postovulation, while sperm can survive in the female reproductive tract for up to 72 hours. Ovulation usually occurs about 14 days prior to menstruation, with the luteal phase being relatively stable in length. The 'fertile window' for women will therefore be different depending on the average length of their menstrual cycle (e.g. for a 28-day menstrual cycle, the optimal fertile window is days 12 to 15). External factors influence the chance of conception. Smoking can decrease the quality and quantity of eggs and sperm. The role of alcohol and caffeine remains controversial, with no compelling evidence to totally abstain while trying to conceive, but moderation is probably sensible. Body mass index (BMI) exerts a strong influence on fertility, with male and female BMI at either extreme associated with a reduced chance of conceiving. However, there is little evidence for so-called fertility diets to improve natural fertility. Stress can have a direct influence on the hypothalamic-pituitary-ovarian (HPO) axis, interfering with regular ovulation, and may indirectly reduce conception by reducing libido and frequency of intercourse. All women trying to conceive should take folic acid 400 mg daily to reduce fetal neural tube defects until 12 weeks' gestation and should take vitamin D 10 mg daily throughout pregnancy. Women at higher risk of neural tube defects, including those with a family history of neural tube defects and those taking anti-epileptic drugs, should take folic acid 5 mg daily.

The main cause of subfertility varies across the world. In Europe, around 30% of subfertility is caused by a male factor, 30% is caused by a female factor, 25% is unexplained and 15% has both male and female or other causes. This can be further broken down into specific causes (some of which are male and some of which are female).

Ovulatory disorders, tubal damage and uterine disorders (e.g. fibroids) are most common, with endometrial pathology, specific gamete defects and endometriosis contributory. Cigarette smoking reduces fertility. General medical conditions including diabetes, epilepsy, thyroid disorders and bowel disease can reduce the chance of conception. Decreased ovarian reserve associated with advanced female age is increasingly important, as couples are more commonly delaying pregnancy until their 30 and 40 years.

Ovulatory disorders. The most common cause of ovulation disturbance is polycystic ovary syndrome (PCOS). Women with PCOS who suffer from oligomenorrhoea due to anovulation may require treatment; however, the hormonal treatments taken to regulate periods or improve hirsutism are contraindicated in women trying to conceive (e.g. the combined oral contraceptive pill). Hypothalamic disorders (including hypothalamic hypogonadism), pituitary disease (hyperprolactinaemia) and endocrine abnormalities (thyroid disease) are less common causes of anovulation.

Tubal problems. Tubal disease is usually associated with pelvic inflammatory disease or endometriosis. Chlamydial infection is a leading cause of hydrosalpinx: a blocked fallopian tube, often with a thickened wall, flattened epithelial mucosa and peri-tubal adhesions. Previous pelvic or abdominal surgery can result in post-operative scar tissue or adhesions that can also compromise tubal patency and function. The fallopian tube is not a passive conduit. Tubal function requires both patency and normal physiology for gamete and embryo transport.

Uterine problems. Uterine factors such as fibroids can interfere with fertility, but their impact depends on their size and location. Submucosal fibroids reduce fertility, but there is insufficient evidence to implicate intramural and subserosal fibroids in reducing fertility. Endometrial polyps sometimes reduce the chance of implantation. Endometrial scarring (Asherman syndrome) from surgery or infection can be associated with lighter or no periods and a significantly reduced chance of conception.

MALE FACTOR

Compromised sperm number or quality is an important contributor to subfertility. There is some evidence that sperm counts are falling, which may be the result of environmental or dietary issues. Spermatogonial cells that produce sperm can be damaged by inflammation (orchitis), and the epididymis that stores mature sperm can also be damaged. Certain iatrogenic influences, including pelvic radiotherapy and surgery for undescended or torted testes, reduce sperm production and damage or block the male reproductive tract. Medical conditions such as diabetes and certain occupations involving contact with chemicals or radiation are associated with male factor subfertility. Occasionally, sperm production may be normal but there are erectile difficulties or problems with ejaculation.

Conclusion, diagnosing a cause of subfertility enables treatment to be targeted to a specific pathology. However, even with a detailed series of investigations, a specific cause may not be found for many couples.

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