Lifestyles Factors and Infertility

Concept Fertility Centre

Many lifestyle choices can potentially reduce human fertility.

A large number of research studies have identified alcohol, smoking, caffeine, recreational drug use, excessive exercise and certain occupations as lifestyle factors most likely to contribute to infertility. Body weight can also have a profound influence on fertility. Further information is presented in the "Effect of body weight on fertility" information sheet (12.1.31).

Alcohol

Alcohol consumption is widespread and believed to be increasing in many countries throughout the world. Research on animals has shown that alcohol can decrease steroid hormone production, inhibit ovulation, and disrupt sperm transport through the fallopian tubes. Does alcohol have similar affects in humans? High and frequent alcohol consumption can contribute to menstrual disorders and an increase in the percentage of abnormal sperm. Pregnant women with excessive alcohol intake have a higher incidence of spontaneous abortion, placental abruptions, pre-term delivery, stillbirth and fetal alcohol syndrome. Whether moderate alcohol consumption has such detrimental effects on reproductive health is less clear. A recent research paper published in the British Medical Journal suggests that it does. The researchers reported that the probability of conceiving decreased with increasing alcohol consumption, even among women who were drinking less than five alcoholic drinks in a week. In another study moderate alcohol intake had no effect on the sperm count or percentage of normal sperm. A study by Professor Robert Winston from Hammersmith Hospital in the United Kingdom found that a glass of wine given to patients at the time of embryo transfer improved the chances of pregnancy. Interestingly, the authors observed that red wine was more effective.

These latter studies suggest that low alcohol intake is not likely to adversely affect fertility. However, for couples trying to conceive and pregnant women, avoiding high and consistent alcohol intake is recommended. Couples with a high alcohol intake who are considering assisted reproduction are advised to seek counselling before commencing treatment.

Smoking

The World Health Organization estimates that approximately one-third of the world population over 15 years of age smokes, even though it is well known that the constituents of cigarettes can cause considerable side effects that are detrimental to general health. Smoking can also adversely affect reproductive health. Recent research suggests that smoking can have harmful effects on both male and female fertility. One comprehensive study showed that smoking can affect all parts of the reproductive system.

These studies have shown that smoking can reduce the number of sperm in an ejaculate and cause DNA damage to developing sperm cells. In one study, smokers were reported to have a reduction in sperm count of 13 to 17% when compared to non-smokers. A small study tracking the sperm count of three smokers 5 to 15 months after they had stopped smoking reported that sperm counts increased by at least 50%, suggesting that any reduction in sperm count is potentially reversible.

A recent study showed that germinal cells in the testes are vulnerable to genetic damage. It is also evident that smoking induced sperm DNA damage can be transmitted to the embryo and subsequent offspring. When examining pre-implantation embryos, researchers found that the altered DNA from the sperm was present in the embryo. Altered sperm DNA from smoking fathers was also associated with an increased risk of childhood cancers.

The evidence that smoking can be detrimental to female fertility is controversial. One study showed that smokers were 3-4 times more likely to take longer than a year to conceive than non-smokers. The chemical components of cigarettes have been isolated in the fluid surrounding developing oocytes (eggs) and smoking has been shown to cause DNA damage during oocyte cell division. However, unlike sperm, oocytes have the capacity to repair DNA damage before fertilization occurs. One study suggested smoking can age the ovaries by 10 years.

Can smoking influence the clinical outcomes of assisted reproductive technologies such as IVF? It has been estimated that approximately 55% of couples undergoing IVF-embryo transfer are smokers, suggesting that smoking is common among couples seeking treatment for infertility. A number of studies have examined female smoking and clinical outcome after IVF–embryo transfer but the results are not conclusive. They do suggest however, that women who smoke during treatment produce fewer oocytes and have increased rates of abortion. It was reported in one study that 11-30 cigarettes per day resulted in a 17% reduction in oocyte number. It should be noted that this result has not been consistently demonstrated. The relationship between smoking and spontaneous abortion has been examined by several researchers. The evidence presented by these researchers suggests that there is a small dose related increase in the rate of spontaneous abortion in women who smoke.

Whether paternal smoking effects the success of IVF-embryo transfer is also controversial. Researchers report that reduced pregnancy rates are associated with male smoking and with increased age of the smoking male.

Although the research to date is inconclusive, the evidence presented suggests that not smoking during IVF-embryo transfer procedures may be beneficial to achieve the desired outcome.

Caffeine

Large research studies have been undertaken in Europe and the USA to ascertain whether coffee consumption is related to infertility. The results however are conflicting and difficult to interpret. The authors of one study concluded that a high level of coffee consumption is associated with an increased risk of delayed conception. One study found that as little as one cup of coffee per day was enough to increase the time taken to get pregnant. Another study of nearly 3000 women found that coffee consumption was not associated with infertility. Other studies have shown 2–3 cups of coffee per day is associated with an increased risk of miscarriage during early pregnancy.

Very little is known about the impact of coffee consumption on semen quality, although in vitro studies have demonstrated that caffeine can enhance sperm motility. There is little evidence that coffee can improve the fertilizing capacity of sperm. In men who drink coffee and smoke, deleterious effects on sperm motility and vitality have been observed.

Recreational Drugs

Use of recreational drugs such as cocaine and marijuana may cause fertility problems. Research studies suggest that cocaine use within 2 years of an initial semen analysis is associated with low sperm counts. The use of cocaine for 5 or more years was found to be much more common in men with poor sperm motility. The authors of this report conclude that cocaine should now be considered a risk factor in male sub-fertility.

Cocaine use by men has also been linked to abnormal development in subsequent offspring. The cocaine is thought to bind to sperm and penetrate the egg at fertilization, resulting in abnormalities in the embryo. Cocaine use by women has been associated with infertility due to abnormalities of the fallopian tubes.

Animal studies have shown that moderate marijuana use stops ovulation by having a toxic effect on the developing egg. A study exploring marijuana usage and the time taken to conceive found that women who smoked marijuana had a slightly elevated risk of infertility due to ovulation problems.

Marijuana can also effect sperm function. Research has shown that sperm motility and the sperm's ability to bind to an egg can be adversely affected by consistent exposure to marijuana.

Excessive Exercise

Proper exercise is important to maintain a desired weight and general level of fitness. Excessive exercise however, can lead to reduced fertility in both males and females. In men, excessive exercise has been associated with reduced sperm production. In women, too much high intensity exercise can lead to the cessation of ovulation. It should be noted that to cause a reduction in fertility the exercise must be extensive. For most couples moderate exercise will not affect their fertility.

How exercise affects fertility is not clear. Is it due to the physical exercise itself, or the energy deficit that occurs when energy expenditure (exercise) is greater than supply (food intake)? To answer this question a comprehensive research study was undertaken by researchers from the department of Anthropology at Harvard University. These researchers investigated 20 fertile women in Poland who worked hard but had an adequate food supply.

The conclusion drawn from this study was that exercise induced ovulation problems are likely to be due to energy expended during physical work or exercise itself, rather than a deficit in energy supplies.

Reproductive disorders that result from excessive exercise can usually be reversed by making adjustments to the amount and type of exercise undertaken.

Occupational Risks

The idea that certain occupations may put workers at risk of reproductive disorders is not new. In 1860 a French scientist noted that wives of lead workers were less likely to become pregnant, and if they were pregnant, more likely to miscarry. The general health effects of lead exposure are now well documented and it has been shown to decrease sperm production in both animals and humans.

Other occupational sources that can reduce sperm quality include heat, pesticides, hydrocarbons, ionizing radiation and estrogens. A study from Australia identified occupations at risk to include transport workers, building industry workers, motor mechanics, farmers and miners. Women are also at increased risk of

infertility from occupation exposures. A study from the USA examined occupational exposures and risk of female infertility and found that women who were exposed in the workplace to chemical dusts, volatile organic solvents, pesticides and video display terminals had an

increased risk of infertility. Interestingly, these authors found that video display terminal exposure was more likely to occur in women diagnosed with endometriosis and cervical problems.

Accumulative Effect of Lifestyle Factors on Fertility

A recent report suggested that adverse lifestyle factors such as smoking, alcohol consumption, excess body weight, caffeine can have an additive effect on fertility. This study examined couples who were trying to conceive naturally over a 12 month period. Only 38% couples with 4 adverse factors conceived compared to 52% with 3, 62% with 2 and 71% with one. Where no adverse lifestyle factors were present 83% of couples became pregnant.

Questions and Notes

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