Review Article

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Association of western diet & lifestyle with decreased fertility

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It has been accepted that food customs are closely associated with the quality of life in both men and women's reproductive life. Food customs are speculated to not only influence the present lifestyle but also to induce gynaecological disorders such as dysmenorrhoea, spermatogenesis and irregular menstruation. Though there is no consistent definition of regular or normal menstruation, epidemiologic evaluation of menstrual cycle has been becoming an important issue. In addition, latent development of organic diseases such as endometriosis, which are accompanied by dysmenorrhoea, is a concern under the current nutritional environment. Thus, it is an important issue to evaluate the present situation of eating habits in couples and estimate the influence of these habits on the quality of reproductive functions. A multi-faceted therapeutic approach to improving fertility involves identifying harmful environmental and occupational risk factors, while correcting underlying nutritional imbalances to encourage optimal reproduction and its function.

Key words Dysmenorrhoea - food intake - irregular menstruation - menstrual disorder - nutrition - reproduction

Introduction

The western pattern diet, also called western dietary pattern or the meat-sweet diet, is a dietary habit chosen by many people in the developed countries, and increasingly in the developing countries. It is characterized by high intakes of red meat, sugary desserts, high-fat foods, and refined grains¹. It also typically contains high-fat dairy products, high-sugar drinks², and higher intakes of processed meat. The western pattern diet is composed of foods that are rich in fat and sugar. Also, there are several important vitamins and minerals that are essential for good health, but are not typically included in the western pattern diet.

Lifestyle factors are behaviours and circumstances that are, or were once, modifiable and can be a contributing factor to sub fertility. Fertility is the capacity to produce offspring, whereas fecundity is a woman's biological ability to reproduce based on the monthly probability of conception. Clinical infertility is defined as the inability to become pregnant after 12 months of unprotected intercourse³. It has been estimated that approximately 15 per cent of the population in industrially developed countries are affected⁴. The causes of infertility are wide ranging including diagnoses such as, ovulatory disorders, tubal disease, endometriosis, chromosomal abnormalities, sperm factors and unexplained infertility. The impact of lifestyle on reproductive performance may vary depending on individual aetiology and circumstances.

The relationship of lifestyle factors such as diet, physical activity, smoking, and alcohol intake, to chronic diseases is well known. Infertility affects approximately 15-20 per cent of all couples trying to conceive, and about half of these cases are due to male fertility⁵. There is good evidence that diet, lifestyle and nutritional supplementation can impact fertility. Infertility can be caused by a huge number of factors: hormone imbalance, polycystic ovarian syndrome, endometriosis, anovulatory cycles, physical blockage, inadequate hormone production, short luteal phase, lack of lutenizing hormone, high levels or prolactin, and many others⁶. With increasing life expectancy and ageing of the population all over the world, the concomitant increase in the burden of chronic diseases and disability has resulted in growing emphasis being placed on primary preventive measures such as lifestyle modifications

Some of the conclusive and inconclusive examples which impaired the fertility are discussed below.

Conclusive evidence

Female age: By the time women reach 35 yr of age, their fertility declins⁷⁻⁹. At an even earlier age, the number and quality of oocytes decrease but it manifests clinically at around 35 yr of age¹⁰⁻¹².

Smoking: Cigarette smoking has been associated with adverse effects on fertility, although this is not widely recognized¹³. In males, smoking negatively affects sperm production, motility and morphology and is associated with an increased risk of DNA damage¹⁴⁻¹⁵. In females, the constituents of cigarette smoke may affect the follicular microenvironment and alter hormone levels in the luteal phase¹⁶.

Weight: Obesity is associated with a range of adverse health consequences. Widely recognized are the increased risks of cardiovascular disease, diabetes and some cancers. Obesity and low body weight can impact on reproductive function by causing hormone imbalances and ovulatory dysfunction. Abnormal weight is usually defined as a high body mass index (BMI) of 25 and a low BMI of 20 kg/m² and the effects of abnormal weight have been reported in several studies¹⁷⁻¹⁹.

Exercise: Regular exercise affects an individual's general health and wellbeing and probably provides

some protection from obesity, cardiovascular disease, hypertension, diabetes, osteoporosis and psychological stress. Research in relation to physical fitness and reproduction is primarily focused on athletes rather than women who have a moderate level of fitness. The exercise has been shown to be associated with a reduction in risk of ovulatory infertility¹⁹.

Inconclusive evidence

Psychological stress may reduce female reproductive performance in various ways. The autonomic nervous system, the endocrine and immune systems have all been implicated²⁰.

Caffeine: The stimulant properties of caffeine have led to its widespread use as a beverage (coffee, tea and soft drinks) and some foods such as chocolate. Its consumption has been reported to prolong the time of pregnancy; although the mechanism is unclear. Caffeine may affect female reproduction by targeting ovulation and corpus luteal function through alterations to hormone levels²¹ and has been associated with higher early follicular E2 levels in females²².

Alcohol: Alcohol consumption has been reported to decrease fertility, although the level of consumption associated with this risk is not clear. Alcohol consumption at the extreme level is known to be dangerous to the unborn child but the effect at lower levels is less certain^{23,24}. The mechanisms by which alcohol could impair conception are unclear but may include an alcohol-induced rise in estrogen, which reduces secretion of follicular stimulating hormone suppressing folliculogenisis and ovulation. It may also have a direct effect on the maturation of the ovum, ovulation, blastocyst development and implantation²⁵.

Nutritional factors: The deficiencies of essential nutrients may adversely affect the functioning of the female reproductive system and cause infertility. Specifically, when deficiencies of folic acid, vitamin B12 or iron have been diagnosed and treated, fertility has been restored in whomen who had been infertile for several years²⁶. The body will not allow conception to occur or a pregnancy to continue if it does not have the basic foundation needed to sustain a pregnancy. Many women turn to a low-fat, high fiber diet in an attempt to increase health and lose weight. Weight loss has been shown to increase fertility, but losing weight in this way may not be effective for increasing fertility because it deprives the body of the necessary proteins and fats necessary for hormone production²⁷.

To optimize fertility through nutrition

For an optimum nutrition it is necessary to remove grains, processed foods, sugars and starches from the diet, and obtain necessary carbohydrates from vegetables, some fruits and starchy sources like sweet potatoes and squash. The healthy fats in the diet especially from sources like coconuts, coconut oil, olives and olive oil, butter, grass-fed meats, eggs, avocado and nuts need to be increased. Proteins especially from grass fed meats, eggs, and nuts are also helpful. There is a need to eat vegetables, especially green leafy varieties and to avoid processed dairy products.

Conclusion

Male infertility is a multifactorial disease process with a number of potential contributing causes. Considering that the majority of male infertility cases are due to deficient sperm production of unknown origin, environmental and nutritional factors must be evaluated. Occupational risk factors, including exposure to heat, chemicals, and heavy metals need to be examined. Lifestyle and dietary choices and pesticide residues may adversely affect fertility. Various nutritional strategies have been presented which have a beneficial impact on egg, female hormone, sperm count, motility, and ultimately on reproduction. It is advisable to consider decreased fertility in both men and women as a physiological early warning system, a "canary in the coal mine", which is acting as a sensitive indicator of environmental disruptions and nutritional imbalances.

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