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Lifestyle Related Fertility Disorders in North Jordan: Potential for Improvement

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Abstract

Objectives: To explore the prevalence rates of lifestyle practices linked to fertility disorders.

Materials and Methods: A cross-sectional descriptive study, using a validated questionnaire, was conducted among sub-fertile couples attending the fertility center at Jordan University of Science and Technology between February 2013 and August 2014.

Results: A total of 126 couples took part in the study. The average length of sub-fertility was 4.2 years. The mean age of the women was 31 years, of whom 70% were <35 years of age. Over 6% engaged in regular sporting activity. Less than 1% of women smoked more than 5 cigarettes per day. For male partners, the mean age was 36 years, of whom 85.7% were <45 years of age. Over 22% engaged in regular sporting activity. None were taking anabolic steroids on a regular basis. Almost 39% of men smoked more than 5 cigarettes per day. The percentage of patients that took advantage of the woman's "fertile days" on 6 occasions over the preceding 6 months was 29.37%. Low stress was encountered in 24.21%, intermediate stress in 40.08%, and high stress in 34.52% of couples. The most frequent cause of stress was delay in achieving pregnancy. Almost 4% of women displayed 2 or more risk factors, compared to 11.1% in their male counterparts.

Conclusion: Behavior-related fertility disorders are common in Jordan. Modifying lifestyle factors for better reproductive health is highly recommended.

Keywords: Behavior, Fertility, Lifestyle

Introduction

Current evidence indicates a 9% prevalence of infertility (1). Patients that are hoping to get pregnant might wonder about their fertility and whether they can improve it. There is an increasing body of evidence that lifestyle factors can influence reproductive health. The post-industrial era is associated with an excessive exposure to certain lifestyle factors and behaviors that have the potential for a positive or negative effect on reproductive performance (2).

Some factors might be beyond patients' control, such as medical issues that affect both male and female fertility, but other lifestyle factors, such as nutrition, weight, exercise, psychological stress, and age of starting a family can be modifiable (2).

Negative effects of lifestyle factors such as environmental and occupation exposure, illicit drug use, cigarette smoking, medications, weight management, exercise, alcohol and caffeine consumption are well documented (3-6). Lifestyle-related fertility disorders were estimated to be responsible for 5% of all cases of subfertility (7). To enhance fertility, such lifestyle factors, once identified, can be modified.

The findings of the effect of body weight on fertility are firmly established in both sexes. Pathophysiologically, being over or underweight would lead to hormonal changes that would lead to oligomenorrhea and anovulation with subsequent subfertility (8-14).

Studies investigating sporting behavior indicate that excessive sport, in terms of frequency, duration and intensity have a negative effect on hormone balance and reproductive performance. The findings of these studies were independent of the confounding factors of age, smoking or body mass index (BMI) (15-19).

There is a plethora of studies that document the detrimental effect of smoking on both male (20,21) and female reproductive performance (22,23). Research indicates that smoking impairs sperm count, motility, morphology and fertilization capacity (20). Women smokers have a significantly smaller number of pregnancies and a higher incidence of miscarriages and ectopic pregnancies (23).

Commonly encountered drugs and medications may be detrimental to semen parameters and male sexual performance (24). These agents may exert a gonadotoxic effect on the testicles, alter the hypothalamic-pituitary-gonadal axis, and impair ejaculation, erectile function and libido (25).

Recreational drugs can affect male fertility. The long-

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term effects of alcoholism include erectile dysfunction, reduced libido and gynecomastia (26). Many studies have suggested that the mutagenic and carcinogenic components of recreational drugs significantly impair sperm count, motility and morphology (27).

Illicit drugs affect the reproductive performance of men. Marijuana interferes with spermatogenesis (26). Opiates adversely affect libido and erectile function and suppress the hypothalamus and pituitary gland. Cocaine impairs erectile function, and amphetamines cause diminished libido (27).

Some prescription drugs impair reproductive performance. The use of antihypertensives, thiazide diuretics and beta-blockers may compound inadequate blood flow to the male genitals and affect potency and libido. Spironolactone inhibits the production of testosterone, prevents the binding of dihydrotestosterone, results in erectile dysfunction and impairs spermatogenesis (25,26).

Calcium channel blockers may inhibit the normal fertilization process by affecting acrosome reaction (28). Alpha-adrenergic blockers, commonly prescribed for benign prostatic hyperplasia and voiding complaints, may cause retrograde ejaculation (29).

Psychotherapeutic agents can lead to erectile dysfunction and reduced libido. Most antipsychotics block dopamine in the CNS and may have alpha-adrenergic blocking effects on the innervation of the internal genital organs, in addition to possible erectile dysfunction (26).

Tricyclic antidepressants, selective serotonin reuptake inhibitors, and phenothiazines have the potential to lead to erectile dysfunction, reduced libido, and impaired ejaculation. In addition, antidepressants may cause substantial elevation in serum prolactin concentrations, with suppression of gonadotropin releasing hormone and inhibition of luteinizing hormone binding to Leydig cells in the testes, with subsequent impaired spermatogenesis. Other psychotherapeutic agents such as monoamine oxidase inhibitors and lithium carbonate can cause erectile dysfunction and ejaculatory problems (26).

Hormonal agents may influence male fertility. Anabolic steroids are being used by body builders and athletes. These agents cause hypogonadotropic hypogonadism and erectile dysfunction by decreasing production of endogenous testosterone. High doses have been associated with oligoasthenoteratozoospermia (25-29). Several commonly prescribed individual agents within each of the major classes of antibiotics may significantly affect fertility. Significant alterations in semen parameters have been documented in patients taking nitrofurans and sulfasalazine. Other commonly used antibiotics, such as erythromycin, may reduce sperm motility and density. Tetracyclines bind to mature spermatozoa and have the potential to affect sperm motility. Gentamicin and neomycin may directly inhibit spermatogenesis (30).

Mental and emotional psychological stress may reduce female reproductive performance by affecting the autonomic nervous, endocrine and immune systems (31). However, the impact of mental and emotional stress on fertility is ambivalent (7,32,33). Given that infertility is associated with stress (34-36), it is not clear whether stress contributes to or is a consequence of subfertility.

The prevalence of sexual dysfunction in subfertile couples remains unclear (37). Sexual disorders as a cause of subfertility are relatively unusual (38). The relationship between sexual disorders and infertility can be reciprocal. Sexual dysfunction may cause difficulty conceiving, and vice-versa, being unable to conceive may cause sexual dysfunctions. Sexual dysfunctions resulting from diagnosis and medical therapy are common in couples with fertility problems, with women being more frequently affected than men (39).

The aim of this study was to review the impact of a specific range of contemporary lifestyle factors that may negatively affect the reproductive performance of subfertile couples. This review focuses on non-communicable modifiable lifestyle factors that may affect fertility. These factors include male and female age, weight, diet, exercise, smoking, caffeine consumption, alcohol consumption and psychological stress.

Materials and Methods

A cross-sectional design utilizing a validated questionnaire was conducted between February 2013 and August 2014. The questionnaire was based on reviewed literature, with special reference to research on behaviors that affect human fecundity. The focus aimed at elements that may affect natural fertility. Lifestyle factors that affect assisted reproductive technologies were excluded.

The questionnaire included questions with pre-formulated answer options. The questions on sporting activities were based on the compendium of physical activity (40), and time frame of the sporting activity per week (41).

Data were analyzed using SPSS 19 (SPSS, Inc., Chicago IL, USA).

Results

A total of 126 couples took part in the study. The average length of subfertility was 4.2 years. Women and men with a BMI >25 composed 38.0% of subjects. The mean age of women was 31 years, of whom 70.6% were <35 years of age, 4.7% had a BMI <18.5, 41.2%, and 0.79% felt that they ate more or substantially more, 6.3% engaged in regular sporting activity, with an average 2.9 h/wk, of whom 11.9% practiced sport for more than 4 h/wk. Less than 1% of women smoked more than five cigarettes per day, or regularly took medicines that were detrimental to fertility. None drank alcohol more than twice per week. In women the most frequent cause of distress was delay in getting pregnant.

The mean age of male partners was 36 years, of whom over 85.7% were <45 years of age, over 11.1% indicated that they ate less or much less than other men, 3.1% felt that they ate more or substantially more, 22.2% engaged in regular sporting activity, with an average of 2.9 h/wk, of whom 12.7% practiced sport for more than 4 h/wk, 38.9% of men smoked more than 5 cigarettes per day. None

drank alcohol more than twice per week. None were taking anabolic steroids or medicines, on a regular basis, that were detrimental to fertility. The most frequent cause of stress was delay in achieving pregnancy.

The percentage of patients that failed to take advantage of the woman's fertile days on no occasion over the preceding 6 months was 2.7%, in contrast to 29.3% that took advantage of this window in 6 out of 6 occasions. The reasons for this were "no inclination," "psychological grounds" and "sexual disorders" in 35.7% of respondents.

The percentage of couples that had delayed one diagnostic investigation or more for childlessness for 3 months or more, despite the advice given to them by their doctors, and despite having adequate time was 19.0%.

Patients fulfilling at least one of the following criteria: women with a BMI <18.5, women that exercised excessively, men or women that smoked >5 cigarettes/day, men that used anabolic steroids, and men or women with dyspareunia and sexual abstention for 6 months were singled out and analyzed for possible behavior-related risk factors. This applied to 36.5% of the 126 female respondents, and to 53.9% of the 126 male respondents. The percentage that displayed two or more risk factors was 3.9% of the 126 females, and 11.1% of the 126 males.

On a scale from 0 to 5 of subjective stress assessment, low stress was encountered in 24.2%, intermediate stress in 40.0%, and high stress in 34.5% of couples attempting conception.

Discussion

Medical literature has identified many lifestyle elements that are amenable to modifications with the view of improving overall fertility. Examples include age of starting a family, nutrition, weight management, exercise, cigarette smoking, recreational and prescription drug use, alcohol and caffeine consumption, psychological stress and others (2-7).

In this study, the mean age of women and men was 31 years and 36 years, respectively. Evidence suggests that age plays an important role in fertility. Previously, reduction in fertility with age was attributed only to the female. In studies that controlled for female age, successful pregnancy was higher in those with a younger male partner. Thus, initiating pregnancy before the age of 30 for women and before 35 for men may provide the highest level of fecundity (42).

Weight may affect fertility. Obesity has a major effect on ovulation but smaller effect on semen quality. In addition, excess body weight increases the risk of miscarriage, stillbirth and preterm birth (43). In the present study, the percentage of women and men, with BMI >25 was 38.0%. This high percentage necessitates further investigation of the fertility status of overweight, obese and morbidly obese male and female partners.

Exercise is beneficial. It has positive effects for the male. Moderate physical activity in men is associated with significantly better sperm parameters (44). In contrast, for the female, it may be associated with a reduced fecundity (45). Underweight men or women who exercise vigorously may be at an increased risk of being subfertile (46,47). In this study, the percentage of women and men that practiced sport more than 4 h/wk was 11.90% and 12.70%, respectively. The stress of excessive exercise may add to the already existent stress of subfertility and further confound the problem.

In this study, the percentage of the women and men that smoked more than 5 cigarettes per day was 0.79 and 38.8%, respectively. Smoking adversely affects the quality of gametes. Cigarette smoke contains over 4000 chemicals (48). Female smoking and second-hand smoke was found to be detrimental to oocyte quality and implantation with an increase in miscarriage rate. In addition, smoking tends to reduce ovarian reserve and disrupt the normal hormone levels of FSH and progesterone (49,50). In men, smoking tends to decrease semen volume, sperm count, density, motility, normal morphology and fertilizing capacity. In addition, it increases sperm DNA fragmentation, with an increase in miscarriage rate (51-53). Furthermore, exposure to cigarette smoke is a leading cause of unexpected infant death syndrome (54).

In men, alcohol consumption has been linked to many negative side effects such as testicular atrophy, decreased libido, oligozoospermia and teratozoospermia (55,56). Women who drink alcohol have an increased rate of anovulation, abnormal blastocyst development, luteal phase dysfunction, decreased implantation rate, increased risk of spontaneous abortion and fetal death (57-59). The degree of the detrimental effects of alcohol on reproductive performance is proportional to the amount of alcohol consumed (60). None of the male or female participants in this study drank alcohol more than twice per week. This is explained by the fact that most Middle Eastern countries strictly control the consumption of alcohol or ban it altogether.

In this study, on a scale of 0 to 5 of subjective stress assessment, low stress was encountered in 24.2%, intermediate stress in 40.0% and high stress in 34.5% of couples attempting conception. Stress has been implicated in influencing reproductive performance, whether it is physical, social or psychological. Males who experience stressful life events are more likely to be affected by low sperm concentration, decreased motility and higher percentages of abnormal morphology (61,62).

Stress is thought to affect the hypothalamic-pituitary-gonadal access, and ultimately reduce testosterone and luteinizing hormone levels, resulting in a disruption of gonadal function and spermatogenesis (62). Furthermore, actively coping with stress may cause adrenergic activation, leading to vasoconstriction in the testes, resulting in lower testosterone levels and decreased spermatogenesis (63,64). Decreased stress levels have been associated with an improvement in fertility (65).

Various studies have shown reduced success rate in achieving pregnancy in women experiencing anxiety, stress, and depression, with certain individuals being more vulnerable than others (66). Infertility itself is

stressful, due to the societal pressures, testing, diagnosis, treatments, failures, unfulfilled desires, and financial costs (67). Stress reduction programs have been shown to benefit couples attempting conception (65). Receiving instruction on how to deal with stress may significantly improve the chances of conception.

A higher conception rate is achieved by women who participate in cognitive behavioral interventions and support groups than in women who do not participate in such groups (65). Positive moods correlate with better take home baby rates (68). The implementation of guidelines on behavior-related subfertility would improve communication and counseling of couples attempting conception (69).

The limitation of this study is that the sample consisted of couples undergoing medical investigation at an assisted reproduction center. Not all subfertile couples seek medical treatment, therefore, the generalized ability of the results is restricted.

Conclusion

A high percentage of couples who attend assisted reproduction centers are likely to be affected by lifestyle-related subfertility. Most lifestyle factors are theoretically modifiable, therefore, a structured programme of counselling would optimize the chances of success and minimize the need for costly and invasive subfertility treatment.

Ethical Issues

All procedures performed in this study involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

Conflict of Interests

The authors declare no conflicts of interests with respect to the research, authorship, and/or publication of this article.

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