

Frequency and Epidemiologic Aspects of Male Infertility

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Received: 19 Oct. 2013; Received in revised form: 2 Jun. 2014; Accepted: 15 Jul. 2014

Abstract- According to different geographical conditions, human health in different sub-regions of the world and cultural differences, the male factor infertility has heterogeneous causes in the world. This study was performed in an attempt to clarify the associated factors that might play a role in this respect in a group of Iranian infertile men. This study was a cross – sectional, descriptive and retrospective study. The information was obtained from the men who had attended the clinic from March 2004-2006. The factors that were studied in this research are the demographic characteristics, smoking, addiction, alcohol drinking, and exposure to lead, cimetidine and history of surgery. In 23.7 % of couples, the cause of infertility was pure male factor and in 19.3 % of them the problem was related to male and female factor both. The most important associated factors for male factor included smoking (29%) and history of varicocele operation (22%). Since the quality of individual and social life is related to fertility state, it seems that more comprehensive studies on factors affecting male fertility at the community level are justified and recommended.

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Acta Medica Iranica, 2015;53(4):231-235.

Keywords: Smoking; Varicocele; Male infertility

Introduction

Infertility means that following one year of unprotected intercourse, the couple will not conceive. Infertility is one of the important issues of human societies. The average prevalence of infertility in different societies is 8-12 percent, and the reasons are numerous (1).

Beside the different anatomical and psychological causes that can affect fertility, some acquired and environmental factors can have an important role (2). Because of differences in many different environmental conditions associated with reproductive behavior, such as age of marriage, multiple sex partners, environmental pollution, smoking and alcohol consumption, prevalence of infectious diseases among the communities, the prevalence of infertility and its etiology varies in different societies.

These differences are particularly significant

between developed and developing countries (3). Causes of infertility can be generally classified into four groups: male, female, both male and female and unexplained (4).

These causes may be different in various studies, nevertheless in most cases the prevalence of male factor has been reported between 20-40 percent, female between 30-50 percent and both 20-40 percent (5,6).

Many studies have been conducted dealing with male infertility and factors affecting it. In a study, Dunson *et al.*, showed that rates of infertility in men and women increases with age (7). Hassa *et al.*, showed that the effect of smoking on semen quality is a time and course dependent one. Moderate and severe smoking had detrimental effects on semen quality in long-term in men who had been referred to infertility clinics (8).

In a research by Viskum *et al.*, improvement in semen quality especially its motility, with the reduction of lead exposure at work was confirmed (9).

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The results of the study by Weber *et al.*, revealed that exposure to mercury can lead to its deposition in the pituitary and cause damage to the testicular function, especially its spermatogenesis (10).

Regarding the effects of alcohol consumption, Emanuele showed that alcohol can cause interference in any part of the male reproductive system including the hypothalamus, anterior pituitary and testis (11). In the study by Okada *et al.*, in six patients with a history of abnormal semen analysis and male infertility factor which had taken cimetidine, serum prolactin returned to normal after the withdrawal of cimetidine but sperm indices showed no improvement (12). In one study in 32 heroin and methadone addicts, 93% of them who were taking heroin and 95% of the other group had abnormal semen analysis (7). The study of D'Agostino *et al.*, showed the time of surgery and the anatomic position of undescended testis can affect fertility (13).

Early diagnosis of severe varicocele leading to testicular hypotrophy may help prevent infertility in men. Austoni showed a significant improvement in semen analysis in 80-60% patients who had testicular poor performance after surgical treatment of varicocele. The results showed statistically significant increase in the rate of fertility too (14). Vas deferens injury during inguinal herniorrhaphy in adults has been reported to be 0.3% and 0.8% - 2.0% in children (15). Evidence shows the mesh used for hernia repair may increase the risk of irritation causing duct obstruction (16).

According to different geographical conditions, human health in different sub-regions of the world and cultural differences, the male factor infertility has a heterogeneous list of causes in the world. Therefore, we decided to investigate the epidemiology of male infertility in Vali-e-Asr Hospital, a referral center for infertility in Iran.

Materials and Methods

This study was a cross – sectional, descriptive and retrospective study that was performed with the acceptance of the research and ethics committee of the Tehran University of Medical Sciences as a medical student's thesis. The information was obtained from the records of 1000 infertile men who were referred to Vali-e-Asr Hospital, Tehran University of Medical Sciences; from March 2004 to 2006. The purpose of this study was to determine the frequency of male infertility and its accompanying

factors. Variables examined included age, drug use, alcohol consumption, cimetidine, lead exposure (occupational exposure), history of varicocele or inguinal hernia operation and history of undescended testis. Sperm parameters included number, motility and morphology. The data processing was done by SPSS V.15 software and descriptive statistical tests including frequency tables, graphs, mean, median and standard deviation were used. Since the design of this study was descriptive, we did not use any statistical analysis.

Results

In a total number of 430 patients (43%) with male infertility, the cause of infertility was pure male factor in 237 couples (23.7%) and male - female (both) in 193 (19.3%). The age range was between 22-60 years. The infertility period was less than 5 years in 193 patients (45%), 5- 9 years in 133 patients (31%) and >10 years in 104 (24%). The demographic characteristics of the patients are shown in table 1.

Based on the results of semen analysis, 17 (4%) patients showed azoospermia, 8 patients (2%) had only abnormal sperm morphology (i.e. abnormal forms in more than 70% of sperms) , 73 (17%) only impaired motility (with less than 50% motile sperms) and 99 (23%) of subjects had only oligospermia but 243 (54%) patients had two or more abnormal parameters.

The results of the survey about associated factors are shown in table 2. The most common factor was cigarette smoking with 125 patients (29%) followed by 95 (22%) patients with a varicocele operation in their past history.

Table 1. Demographic characteristics of study groups

Frequency (%)	Variable
Age (year)	20-40
	41-60
Occupation	Laborer
	Employee
	Other
	Illiterate
Education	Primary & Secondary
	High School
	Diploma and above
Duration of Infertility	< 5yrs
	5 – 10 yrs
	> 10 yrs

Table 2. Risk factors identified in the study group

Variables	Frequency (%)	
Cigarette smoking	125(29%)	
Operation	Varicocele	95(22%)
	Hernia	26(6.2%)
	Orchiopexyj	18(4.2%)
Undescended testis	26(6.2%)	
Opium addiction	39.56(9.2%)	
Alcohol consumption	24(5.5%)	
Cimetidine	3(0.9%)	
Lead exposure	2 (0.6%)	
Idiopathic	72(17%)	

Discussion

In the present study, male factor was the cause of infertility in 43% of the patients with pure male factor in 23.7% and male - female (both) in 19.3%. In a multicenter survey by Thonneau *et al.*, in three regions of France for one year in 1686 couples, the prevalence of infertility was about 14.1%, with 21% being due to male factor and 39% of patients due to disorders in both the man and woman.(17). In a study by Matsuda *et al.*, (18) in northern Tanzania, the prevalence of male factor was 6.7%, female factor 65.9% and both 15.2%. In a study on the spermogram in infertile couples, Sigman and coworkers found that 14% of them were normal, 14% azoospermic and 49% had a combination of several disorders. Oligospermia was seen in 4% of subjects, asthenospermia in 6% and teratospermia was reported in 4% of cases (19). In a report by Turek *et al.*, 55% of the men from infertile couple's cases had normal spermogram. Asthenospermia was reported in 26%, oligospermia in 8% and teratospermia in 1% of all subjects. (20). Conflicting results from different studies could be due to different cultural, social, economic and environmental situations in each country that are affected by the epidemiologic characterization of infertility (2,3).

In current study, smoking was the most common factor that influenced or was associated with sperm abnormalities. In this study, 29% of infertile men were smokers, 5.19% of them smoked up to 10, and 5.9% smoked more than 10 daily. In a study by Zhang *et al.*, about the effect of smoking on semen quality, 115 non-smokers and 191 smokers who were referred to the infertility clinic participated. All semen parameters were reduced in the long time in heavy or moderate smokers. It seems that cigarette smoke compounds according to dose, individual sensitivity and time of exposure interact with reproductive function (21,22).

One of the most common causes of male infertility is varicocele, which is found in 21–41% of men with primary infertility and 75%–81% of those with secondary infertility (23). In this study, 22% of participants were affected by varicocele. Recent studies conclude that varicocele might affect all of the parameters in a semen analysis such as the concentration, motility, forward progression and the morphology. The treatment for varicocele is surgical ligation of the affected veins, which allows the normal functioning veins to improve the drainage of the testicle. For most patients, an improvement in sperm production can be seen four months after surgery. Most studies show a 65 percent chance of improved sperm production with 45 percent of couples achieving pregnancy after varicocele ligation (23-25).

The prevalence of undescended testis in the present study was 6.2%, and orchiopexy was performed in 4.4% of the patients. Sigman *et al.*, has reported a prevalence of undescended testis about 3% (19).

In the current study, 9.2% of infertile men had a drug addiction. In a study by Ragni *et al.*, on the evaluation of heroin and methadone abuse effects on semen parameters in which 32 addicts had participated, 93% of those who were addicted to heroin and 65% of addicts to methadone had abnormal seminal assay with teratospermia in 28% and oligospermia in 16% (26).

In this study, 5.5% of infertile men reported alcohol consumption. In a study by Tsjimura & associates about the effect of lifestyle on male infertility, performed on 272 infertile and 251 healthy fertile men, the prevalence of alcohol usage was 92% in the infertile men group and 80% in the control participants (27).

Cimetidine was consumed in 0.9% of infertile men in the current study. In a study by Okada *et al.*, the prevalence of hyperprolactinemia in male factor infertility was 5.7% and 2.3% of those patients who were taking cimetidine (12). Cimetidine is supposed to

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be acting directly or indirectly on the dopamine receptor in the anterior pituitary to cause hyperprolactinemia that is reported to be associated with hypogonadism in men (28).

It seems that various factors can affect the reproductive ability of men. Many of these causes are not yet known. Obviously, the increasing environmental pollution in industrial cities affects male fertility. Considering the more contributory role of smoking and varicocele compared to other factors in infertile men in the existing studies including the current study, the reduction of smoking and varicocelectomy might reduce the risk of infertility in men.

Since the quality of individual and social life is related to fertility state, it seems that more comprehensive studies on factors affecting male fertility at the community level are justified and recommended.

Acknowledgment

We acknowledge the financial supports of the research council of the Tehran University of Medical Sciences for this medical student's thesis and our colleagues at the Vali-e-Asr Reproductive Health Research Center.

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