Epidemiological Features of an Infertile Male Population

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OBJECTIVE: This research aims to identify the epidemiological features of Turkish men who seek medical help for their childlessness.
STUDY DESIGN: 474 men attending to the out-patient urology clinics of our hospital between January 2005 and January 2006 were questioned in aspects of age, fertility, occupation, chronic diseases, surgical history, trauma, and drug usage, smoking, alcohol intake, substance abuse and exposure to gonadotoxins.
RESULTS: The majority of the participants were 25 to 35 year-old Caucasian men who had primary infertility. 91.4%, 98.3%, 87.6% of these subjects did not reveal any disease, trauma and drug usage associated infertility. 41.1% of the study population had scrotal operations. %62.9 of these participants was smokers yet only 7.6% of them consumed alcohol. Although %67.7 of the patients did not have any jobs that might be associated with infertility, 32.9 % of patients were exposed to occupational gonadotoxins; mostly heat. 10.8% and 8.0% of the study population were drivers and farmers exposed to heat and pesticides respectively.
CONCLUSION: Many childless men represent as young males who are at obvious risk due to congenital and acquired genital abnormalities and silent exposure to environmental and occupational hazards. Men chronically exposed to heat and pesticides due to either sedentary or agricultural work are considered to be at utmost risk for infertility.

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Key Words: Male infertility, Etiology, Epidemiology

The understanding of male reproductive function and the importance of male factors in infertility has advanced significantly in the last decade. According to World Health Organization, the incidence of male factor infertility in the general population is approximately 7%. Abnormalities in the male are the sole cause of infertility in approximately 20% of infertile couples and are an important contributing factor in another 40–50%.[1]

Unfortunately the cause of infertility is never found in almost 17.5% of affected couples and 25% of men, merely reflecting the fact that mechanisms that direct reproductive functions in men are still poorly understood.[2]

Many epidemiological factors such as age, congenital and acquired genital abnormalities, chronic diseases, surgical procedures, trauma, drugs and environmental agents are blamed to be responsible for male infertility. Relevant environmental exposures including heat, smoking, radiation, heavy metals, organic solvents, and pesticides have been investigated throughout the last decade and are considered to be potential hazards.[3]

This research aims to identify the epidemiological features of Turkish men who seek medical help for their childlessness.

Material and Methods

Experimental Design: A cross-sectional and observational study was undertaken in a group of Turkish men who seeking professional help for their childlessness.

Ethical Approval: The present study was approved by The Institutional Review Board and the Ethics Committee of Dr Zekai Tahir Burak Women's Health Hospital where the study was conducted. Each participant of the study was informed about the study and their written consents were obtained.

Subject Recruitment: A total of 474 Turkish men attending to the out-patient clinics of urology department in Dr. Zekai Tahir Burak Women's Health Hospital between January 2005 and January 2006 due to their infertility problem were eligible.

Inclusion Criteria: Men who coul not achieve conception in spite of unprotected sexual intercourse with their partners were included in the study.

Main Outcome Measures: The epidemiological features of infertile Turkish men including age, medical and surgical history, trauma, occupation, smoking, alcohol intake and sub-

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stance abuse were assessed.

Data Collection: Every subject was interviewed by the physicians in the aspects of age, infertility, chronic diseases, surgical operations, drug use, occupation, trauma, smoking, alcohol intake, substance abuse and exposure to gonadotoxins. The answers to these questions were kept as written medical records which were then analysed.

Statistics: Collected data were analysed by using the Statistical Package for Social Sciences (SPSS for Windows, Version 11.0, SPSS Inc. USA). The characteristics of distribution were tested with the Kolmogorov-Smirnov test. Results were expressed as percentages.

Results

427 out of 474 participants (90.1%) had primary infertility that continued for an average of 7.6 years. More than half of the participants (58.4%) were 25 to 35 year old Caucasian men. The mean age of the study population was computed to be 32.3 years (Table 1).

Table 1: Age of The Subjects

	Frequency	Percent
<25	37	7,8
25-35	277	58,4
36-45	136	28,7
>45	24	5,1

Although 48.9% of the participants did not undergo any surgical operation, 197 out of 474 subjects (41.1%) revealed a history of scrotal surgery. 100 participants stated that they had varicocelectomy, while another had their cryptorchidism corrected. Two patients claimed having orchiectomy because of testicular torsion. Only 4.6% of patients had no history of surgery that might be concerned with their infertility (Table 2). The generality of the patients (98.3%) did not experience any trauma to their external genitalia.

Table 2: Surgical History of Subject

	Frequency	Percent
none	232	48.9
extra-GUS* surgery	22	4.6
renal transplant	2	.4
retroperitoneal surgery	7	1.5
inguinal hernia repair	16	3.4
scrotal surgery	195	41.1
Total	474	100.0

The predominance of the subjects (91.4%) did not have any chronic diseases that could be related to their complaint of infertility. Several patients declared systemic diseases such as vasculitis (including Behçet's disease and diabetes mellitus), cardiovascular disorders, malignancies (including testis tumour and Hodgkin's disease), neuropsychiatric disorders while scanty numbers of patients pronounced testicular infection (especially mumps) and cryptorchidism (Table 3). 87.6 % of the participants did not have to use drugs regularly because of chronic diseases.

Table 3: Medical History of Subjects

	Frequency	Percent
none	433	91.4
diabetes mellitus	8	1.7
infectious orchitis	6	1.3
asthma	2	.4
policystic renal disease	5	1.1
cardiac valve dysfunction	5	1.1
psychiatric disorders	8	1.7
endocrinopathies	5	1.1
malignancy	2	.4
Total	474	100.0

62.9% of participants had a habit of smoking one package per day for an average of 11 years whereas 37.1% of them were non-smokers. 7.6 % of these infertile men had been regularly consuming 10 glasses of alcohol per day for an average of 10.1 years. Only one participant expressed abusing hashish for five years.

%67.7 of the participants did not have jobs that caused exposure to potential hazards that may be associated with infertility. 10.8% and 8.0% of this infertile population were drivers and farmers who were being exposed to heat and pesticides respectively for an average of 12 years (Table 4). 32.9 % of participants were exposed to gonadotoxins; most prominently heat followed by pesticides and other industrial chemicals due to their jobs. Only two out of 474 subjects were exposed to chemotherapeutics while being treated for Hodgkin's disease (Table 5).

Table 4: Occupation of Subjects

	Frequency	Percent
no-risk job	321	67.7
drivers	51	10.8
food industry	31	6.5
farmers	38	8.0
plastic industry	7	1.5
paint industry	11	2.3
chemical industry	15	3.2
total	474	100.0

Table 5: Gonadotoxin Exposure to Subjects

	Frequency	Valid Percent
Radiation	1	.6
chemotherapy	2	1.3
heat	77	49.4
pesticides	44	28.2
organic solvents	21	13.5
heavy metals	11	7.1
total	156	100.0

Discussion

The relationship between age and fertility in men is more difficult to define than in women. Although fertility in men appears to decline as age increases, the effects of age are much less obvious.[4] Yet the available evidence indicates that pregnancy rates decrease and time to conception increases as male age increases.[5] However the participants of our study were mostly young men between the ages of 25 and 35 with a mean age of 32.2. Such a result may suggest that the majority of our study population were affected by serious congenital or acquired genital disorders so that infertility appears at an early period of life.

An anamnesis of mumps orchitis suggests the possibility of testicular atrophy and dysfunction. Genital infections also may impair testicular anatomy.[6] Diabetes mellitus leads to bladder neck dysfunction that results in retrograde ejaculation. Cystic fibrosis is highly associated with congenital absence of the vas deferens.[7] Only 8 of 474 subjects (1.7%) expressed having diabetes mellitus and 6 participants (1.3%) remembered that they had mumps orchitis. Mumps orchitis cases may be more frequent than being assessed in our study as there is bias related to recalling.

Inguinal hernia repair, renal transplantation, and scrotal surgery are associated with risks for unrecognized injury to the vas deferens. Retroperitoneal surgery can cause ejaculatory dysfunction by disrupting neural pathways.[8] 41.1% of the participants stated that they had gone through surgical procedures concerned with their testes. Moreover only 4.6% of the participants had revealed surgical history which could not be attributed to their infertility. Surgery which is associated with congenital or acquired genital disorders seems to be an important contributing factor in male infertility.

Certain drugs such as cimetidine, spironolactone, nitrofurans, sulfasalazine, erythromycin, tetracyclines,[9] chemotherapeutic agents[10] and anabolic steroids[11] can act as gonadotoxins. Only 1.3% of the participants revealed that they were meticulously treated with antibiotics including erythromycin and tetracyclines. 3.4% of the subjects claimed that they had used hormonal agents, especially gonadotropins and thyroxine. Only two participants had used chemotherapeutic agents for the treatment of Hodgkin's disease. Although drugs do not appear to exert significant effects on male infertility, any physician should be careful when prescribing for healthy men at reproductive age.

A modest increase in scrotal temperature can adversely affect spermatogenesis, and a febrile illness can result in transient but dramatic decrease in sperm density and motility.[12] Environmental sources of heat, including tight-fitting underclothing,[13] hot baths and occupations that require long hours of sitting might decrease fertility but none has ever been evaluated thoroughly in clinical studies. Persistent exposure to environmental or industrial toxins such as organochlorine,[14] lead,[15] hydrocarbons[16] and pesticides[17] might cause infertility by interfering with spermatogenesis. Nearly 1/3 of the participants in our study were found to be exposed to gonadotoxins, with heat being the most prominent. 10.8% and 8.0% of this infertile population were drivers and workers being exposed to heat in food, steel and other heavy industries who were being exposed to heat and pesticides. So it can be considered that being exposed to heat or pesticides causes a greater risk of infertility.

Chewing tobacco,[18] smoking[19] and heavy use of alcohol [20] or cocaine[21] can decrease semen quality and testosterone levels. 62.9% of the participants in our study had a habit of smoking whereas 7.6 % of them had been consuming alcohol. Only one participant expressed abusing hashish for the last two years. So smoking is approved to be a significant social habit associated with male infertility.

The participants of our study represent with similar findings in aspects of age, duration of infertility, chronic disease, surgical intervention, trauma, drug usage, alcohol intake, smoking, substance abuse and occupational exposure to gonadotoxins when compared with the subjects of a study conducted by Cavallini.[22] However the frequency of primary infertility seems to be relatively more in our study. Buiatti et al found male infertility to be unconcerned with coffee consumption, alcohol intake, smoking, X ray exposure, socioeconomic status and educational level[23] Moreover Aziz et al found male infertility to be disassociated with occupation, race, religion, smoking or alcohol consumption.[24] Despite the fact that a relation between smoking and male infertility has been shown, alcohol consumption was found to be irrelevant in our study. Also male infertility was detected to be strongly correlated with occupational exposure of certain gonadotoxins, prominently heat and pesticides.

In summary, the findings of our study approve the possible relations between smoking, genitourinary surgery, heat, pesticides and male infertility. However no significant correspondence could be established among age, alcohol consumption, chronic diseases, trauma and male infertility.

This study claims that the previously considered, infertility-associated risk factors such as age, alcohol and trauma might not be as influential and certain factors such as smoking, surgery, heat and pesticide exposure might affect male infertility in more concealed aspects. That's why; further investigation is needed to understand the sophisticated aetiopathogenesis of male infertility so that precautions could be taken for reproductive health of all community.

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