Journal of Kufa for Nursing Science Vol. (3) No.(3) 2013

Effect of Smoking on Semen Quality of Infertile Men in Mosul City, Iraq

تأثير التدخين على نوعية السائل المنوي من الرجل العقيم في مدينة الموصل، العراق

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الخلاصة
الهدف:من المعروف أن التدخين يؤثر على نوعية **السائل المنوي** .الهدف من هذه الدراسة هو مقارنة **السائل المنوي من مدخني السجائر** يعانون من العقم **مع** غير المدخنين يعانون من العقم، **وكذلك مع الرجل الأصحاء لدراسة** تأثير التدخين على نوعية الحيوانات المنوية.
المنهجية: تم تطبيق **دراسة** الحالات والشواهد **في الدراسة** الحالية. للفترة من الاول من شباط حتى الاول من نيسان 2011 **وتمت مقارنة** نوعية السائل المنوي للرجال العقيمين المدخنين (150) و العقيمين غير المدخنين (100) **مع** (100) من الرجال الأصحاء غير المدخنين. **تم إجراء** تحليل السائل المنوي التقليدي **و** مورفولوجية الحيوانات المنوية **حددت بواسطة** المجهر الإلكتروني. تم تصنيف **المرضى والمدخن متوسط** (1 - 10**سجائر** / د) ، **المعتدل** (11 – 20 سيجارة / يوم) ، **أو** المدخنين الشرهين(**أكثر من** 20 سيجارة / يوم). البيانات التي تم تحليلها من خلال **الإحصاءات لستنتاجي**
النتائج: أظهرت نتائج الدراسة أن جودة معايير الحيوانات المنوية **لدى المدخن كان أقل** تقريبا من الرجال غير المدخنون و أن **ل**تدخين السجائر **والجرعة** تأثير سلبي كبير على معايير الحيوانات المنوية.
الاستنتاجات:إن نتائج هذه الدراسة تشير إلى إن التدخين يؤثر**سلبا على خصوبة الرجل**.
التوصيات: يجب على المدخنين الإقلاع عن التدخين للشعور بالمسؤولية لأجيال المستقبلية لما لدخان التبغ أضرار بسبب مايحتويه على العديد من المواد المسببة للتشوهات الخلقية.
المفردات:تدخين **السجائر ، العقم عند الذكور**.

Abstract
Aim: It's known that cigarette smoking affects semen quality. The aim of the present study is to compare the semen of infertile cigarette smokers with infertile non-smokers as well as with healthy men to examine the impact of smoking on the quality of sperm.
Methodology: A case-control study was applied in the present study. For the period from 1st January till the 1st April 2011. The semen quality of men with infertility, smokers (n 150) and nonsmokers (n100), were compared with (n 100) healthy- nonsmokers men. Conventional semen analysis was performed and sperm morphology was assessed by transmission electron microscopy (TEM). Smoker patients were classified as mild (1 -10 cigarettes/d), moderate (10 -20 cigarettes/day), or heavy smokers (more 20 cigarettes/d).data was analyze through inferential statistics
Results: The study finding showed that sperm parameters quality in smoker men was approximately lower than nonsmoker men and the cigarette smoking and the dose has significant negative effect on sperm parameters.
Conclusion: The results of the present study suggest that smoking negatively affects male fertility.
Recommendation: Smokers should quit smoking for the sense of responsibility for their future generation as tobacco smoke contains numerous mutagenic substances.
Keyword: Cigarette smoking, Male, infertility.

INTRODUCTION:

Since the first appearance of humans on earth, infertility has been one of the most controversial medical and social issues. Male problems may contribute to the commonest single defined cause of infertility. Analysis of etiology has been based on conventional semen profile with information analyzed on the volume of ejaculation, the concentration of spermatozoa, their motility, morphological appearance, and inter-

ejaculate variability [1]. World Health Organization (WHO)[2] reported that, infertility becomes a public health problem when its frequency exceeds 15%. Infertility affects (13-25%) of couples and growing evidence from clinical and epidemiological studies suggests an increasing incidence of male reproductive problems. There is a male factor involved in up to half of all infertile couples [3, 4]. There are strong evidences that smoking behavior is related to social factors, particularly the influence of parents and peer groups. Taste and smell also influence the inclination to smoke where exciting sensory organs in the lips, mouth, and throat provide sensations of touch, taste and irritation. Also, it has been suggested that high negative mood variability is a risk factor for future smoking escalation and that its mood-stabilizing effects may reinforce and maintain daily cigarette use among youths [5]). The aim of our study was to compare the various semen parameters of infertile men who were cigarette smokers with non-smoking infertile men, in order to ascertain the effect of cigarette smoking on the quality of seminal fluid.

METHODOLOGY:

The study was carried out in consultation clinic of Mosul University/College of Medicine. Patient's interview, semen collection, and analysis were done in the clinic labs. A case– control study was adopted to achieve the objectives of the present study for the period from 1st January 2011 till the 1st April. 2011. A purposive sample consisted of (250) infertile males was chosen according to the following criteria; The male who were diagnosed with primary and secondary male infertility, their age ranges between (20-50) years, Free from chronic disease, Had normal genital organs, Agreed to participate in the study. Infertile men with a zoospermia and Leukocytospermia(>1 million / ml) were excluded from the study. A Control Group were collected from (100) volunteers fertile male according to following criteria; They had at least one child during last year, They are free from chronic disease and Their age ranges between (20-50) years. Semen samples were obtained by masturbation after (3-4) days of sexual abstinence. After collection of the sample incubated in (37^0C), and examining the sample for liquefaction, seminal volume, pH, sperm count, motility, morphology were evaluated according to World Health Organization (WHO) guidelines ([6]). The seminal plasma was separated from spermatozoa and other components by centrifugation at (3000) round perminute for (10) minutes, and put supernatant (seminal plasma) in plane tube and kept freezing at (-8^0C) [7]. This procedure was made in consultation clinic of Mosul University/College of Medicine Data are prepared, organized and entered into a computer file; Statistical Package for the Social Science (SPSS, version 17) is used for data analysis.

RESULTS:

Table (1): F test for the differences between seminal fluid parameter among smoker, nonsmoker and control group according to their smoking.

Seminal fluid parameter	Smoker patients group		Non Smoker patients group		Control Group		F value
	Mean	±SD	Mean	±SD	Mean	±SD	
Volume (ml)	3.02	0.8	3.22	1.1	3.67	2.6	11.05
Sperm count (million/ml)	38.05	2.8	39.11	1.3	43.01	2.2	10.68
Non motile (%)	0.34	0.1	0.30	0.3	0.28	0.14	9.41
Abnormal morphology (%)	0.49	0.14	0.45	0.5	0.39	0.13	21.6

P value = 0.05

Table (2):Comparison of variable of different groups of smokers and the group of nonsmoker patients.

No. of Cigarettes/day	Volume (ml)	Sperm count	Non Motile	Abnormal morphology (%)
Non smoker	3.22(±1.1)	39.11(±1.3)	0.30(±0.3)	0.45(±0.5)
Mild (1 and 10)	3.18 (±0.9)	36.01(±1.2)	0.33(±0.1)	0.48(±1.2)
Moderate (10 and ,20)	3.1(±1.2)	35.56(±1.4)	0.35(±1.4)	0.49(±1.21)
Heavy (20)	2.89(±0.3)	33.86(±1.6)	0.39(±1.2)	0.49(±0.5)
Control	3.67 (±2.6)	43.01(± 2.2)	0.28(± 0.14)	0.39(± 0.13)

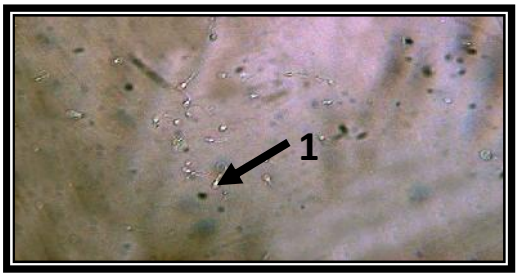

Figure (1): Abnormal morphology of sperm with (coiled tail) in smoker patients:

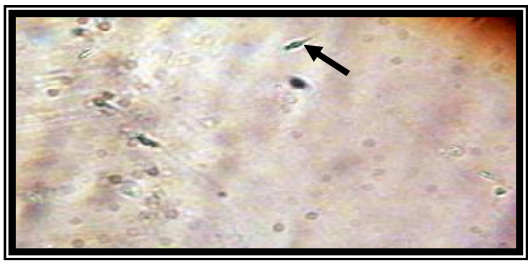

Figure (2): Abnormal morphology sperm (loss of tail) in smoker patients

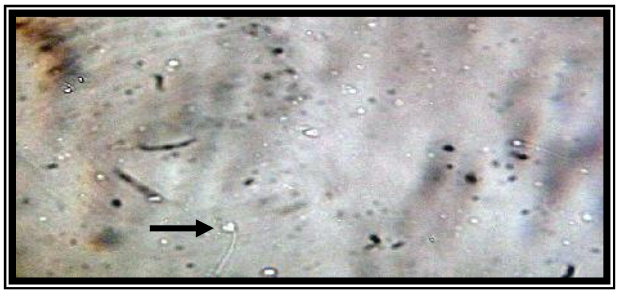

Figure (3): abnormal morphology sperm (double heads)in smoker patients

DISCUSSION:

In the present study, we examined the sperm parameters quality among infertile smokers, nonsmokers and compared with healthy men. The study showed that the cigarette smoking has negative impact on sperm count, motility, and normal morphology. This result is agreement with Different articles have demonstrated a negative impact of smoking on human semen parameters, correlated with cigarettes smoked/ day and smoking duration. Most papers have argued that smokers demonstrate lower semen volume, sperm count, sperm motility, and viability compared with non-smokers. In addition, smokers showed increased seminal

leukocytes, oval sperm percentage, head-piecespermatozoa defects percentage and spermatozoa with cytoplasmic droplets [8].

A recent studies shows that cigarette-smoking lead to decrease the semen quality with many mechanisms, one of these mechanisms is seminal and antioxidant. Ascorbic acid is one of the most essential antioxidant in semen, with human seminal plasma containing ~10 mg/dl ascorbic acid, >9 times its concentration in blood plasma [9]. Heavy smoking in men is associated with a 20%–40% decrease in serum ascorbic acid, and ascorbic acid supplement to heavy smokers lead to improved sperm quality [10, 11]. Seminal Zn, Cu and superoxide dismutase (SOD) have been shown to be much lower in medium, heavy and long-term smokers than non-smokers, being negatively correlated with the amount and duration of cigarette smoking ([10-12]. Saleh et al. [12] associated smoking with a 48% increase in seminal leukocytes, a 107% increase inROS levels, and a 10-point decrease in ROS-TACscores. The active transfer of cigarette components through the blood-testis barrier has been shown to possibly induce oxidative stress-induced DNA damage, one of the causes of sperm quality alteration[13]. Mostafa et al. [14] showed that fertile subjects, smokers or not, had significantly higher seminal ascorbic acid levels compared with infertile groups. Seminal ascorbic acid in smokers and non-smokers was correlated significantly with sperm count, sperm motility and sperm normal forms percentage. Kiziler et al. [15] showed that malondialdehyde (MDA), protein carbonyls, ROS levels, GSH levels and glutathione S-transferase activities were lower in infertile smokers compared with fertile men or infertile non-smokers. Pasqualotto et al. [16] and El Shal et al. [17] reported that seminal SOD levels were negatively correlated with cigarette smoking.

To bet understanding the effect of the number of cigarettes smoked daily might participate a negative role in semen quality, we divided the smoker subjects into 3 groups (mild, moderate, and heavy smokers), and we compared them with the nonsmoker group. Only sperm concentration and FI were significantly reduced in heavy smokers compared with mild smokers and nonsmokers. It should be noted that the group of moderate smokers, despite a lower FI compared with that of mild and nonsmokers, showed higher motility and concentrations. This discrepancy might be explained by the fact that the fertility index is influenced by sperm concentration and motility, but also by morphological evaluation of the single organelles by TEM. In addition, the small size of the group of moderate smokers should be taken into account.

CONCLUSION:

In conclusion, although smokers as a group may not experience reduced fertility, males with marginal semen quality may benefit from quitting smoking.

RECOMMENDATION:

Smokers should quit smoking for the sense of responsibility for their future generation as tobacco smoke contains numerous mutagenic substances.

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