# The Effect of smoking in different durations on some of the fertility parameters for the patients attending an infertility center of Al-Sader teaching hospital in governorate of Al-Naiaf AL-Ashraf

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## Abstract

This study have been performed in June 2009 in the center of infertility of Al-Najaf AL – Ashraf governorate. The aim of this study is to investigate the relationship between cigarette smoking and semen parameters for 40 specimens included control provided from men who are smoking in different durations were divided into three yearly durations (5-9),(10-14)and (15-20) years regardless of the number of cigarettes per day, each group contain ten samples. Semen analysis was performed manually according to the World Health Organization(WHO) criteria standard guidelines and the results are compared with control. The results were showed that sperm parameters quality in the last group of smokers was lower than others so that it has been represented the most effect of group), therefore it appears that smoking effects on the mainly sperm parameters such as sperm count, sperm morphology and motility additional to liquefaction time and semen volume, this effect is represented by reduced semen quality and quantity in hich sign to arise the risk of idiopathic male infertility.

# Introduction

The health hazard of smoking expends far beyond lung disease, blood vessels, and even impact fertility these effects although different, are present in both man and women(Nice,2004). In women, smoking can damage the ovaries lead to miscarriage and even increase the risk of cervical cancer , it is also reduce their probability of conception 40%, the effect of smoking on fertility is dramatically illustrated regarding of sex (ASRM). Men who smoke have been shown to have abnormalities in both sperm quality and quantity which translate in to higher rates of infertility (Kort ,etal.2006). Cigarette smoking decrease fecund ability ,which can be assessed through a semen analysis, in that spermatozoa have been reduced in men who smoke(Dikshit, etal.1987). Tobacco can also lead to impotence by causing damage to blood vessels, the mechanism of developing an erection that is dependent on healthy veins, in vein disease as in the case of chronic cigarette use, blood flow is decreased and thus cause weak and infective erection. (Wine, etal. 1996). Scientist suspect that tobacco may increase a man risk of sterility in which it cause several changes in male reproductive system, they may interfere with its normal function .( Sala .Horowitz-2006). Smoking can affect on fertility , it is best to refrain from smoking completely to optimist fecund ability. Presently there is no safety limit of the number of cigarette one can smoke . Even smoking periodically , such as during social occasions , can affect fertility potential and outcome(Parry, etal. 1997). Despite worldwide anti-smoking campaigns, cigarette smoking is very common. The highest prevalence of smoking is observed in young adult males during their reproductive period (46% smokers between 20and 39 years)(Nice,2004).Other drugs associated with infertility include alcohol ,excessive caffeine narcotics some medicines ,additional to tobacco. Infection of reproductive tract also affect male fertility, bacteria can affect on semen quality and causes an obstruction of the common sites of infection such as prostate, epidydimis, and seminal vesicles. (Agrawal, and Sharma, 2007). The effect of smoking on semen quality has been investigated in a number of cross-sectional studies, most of which have included infertility patients, their results are conflicting: some report smokers to have a lower semen quality in terms of the conventional semen characteristics (semen volume, sperm concentration, total count, motility and morphology), whereas others report no effect of smoking(Vine, 1996). Alcohol and tobacco are considered toxic to sperm decreasing the consumption of these drugs or eliminating them altogether will be recommended ( Joanna and

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Elington ,2005). Recently several studies have been addressed the effect of smoking on male fertility, there is very good evidence that smoking can have an adverse effect on sperm count, motility, and function or hormone production(close, etal. 1990). It is always a good idea to quit smoking particularly when trying to conceive(Close, etal.1990). Smoking cessation as a treatment issue in couples undergoing fertility therapy, so that one important investigation shown that cessation of smoking for at least two months before attempting in vitro fertilization (IVF) significantly improve chances for conception, although long term smoking can have on irreversible effect on ovarian function and testicles with prostate function(Handelsman,2002), the harmful effect on treatment outcome may in part be reversed if smoking is discontinued prior to entering in to fertility therapy. The best available scientific data indicate that cigarette strongly reduces the fertility, therefore smoking should be discouraged for both male and female partners with couple with a history of infertility, it is also cessation may improve natural fertility and success rates with infertility treatment, so that nearly twice a many (IVF) attempts are required to conceive in smokers than in nonsmokers (Klaiber, etal .1987). In relation to male fertility, men who smoke have a lower sperm count and motility with increased abnormalities in sperm shape and function. The effect of smoking, however is more difficult to discern because it is difficult to create studies to address that question. Although this effect remain in conclusive, The harmful effect of passive smoke on fertility adversely effect sperm quality suggest that regarded an infertility risk factor (ASRM). A possible dose-response relationship between increased number of cigarettes smoked per day and decreased semen quality They all suggested a decline in semen volume, sperm concentration, motility or morphology with an increase in the number of

cigarettes smoked per day(Vine,1996). Materials and methods

# Patients

This prospective study was performed in June 2009 in the infertility center of AL-Sader teaching hospital, governorate of AL-Najaf AL-ashraf . Semen were evaluated using a questionnaire included the duration of smoking. Men were grouped into smokers within (5-9)years duration ,(10-14)years duration , and (15-20)years duration , the results of semen analysis are given in table of smokers and their seminal parameters .

## Preparation

Patients have been asked to abstain from sexual activity for three days before the test and A semen specimen is submitted for laboratory analysis.

#### Semen analysis

The participants produced semen samples by masturbating into 50-ml polyethylene jars. The samples were collected at the participants' homes and kept close to the body during transportation to avoid cooling. The samples were analyzed in a where semen volume was measured in a graded tube with 0.1-ml accuracy or in a balance. Sperm motility was assessed after liquefaction by grading the sperm cells as either motile (grade a and b) or immotile (grade c and d). Sperm concentration was counted in a Makler, a Neubauer or a Bürger-Türk chamber using a phase-contrast microscope. The use of different counting chambers has by some been shown to produce similar sperm concentration results ( understanding semen analysis 1999). For this reason, we initially performed stratified analysis according to chamber (Neubauer versus Makler and Bürger-Türk)and, chamber did not modify the association between smoking and sperm concentration. Trained medical laboratory technicians performed all the analyses in accordance with the successive editions of the guidelines published by the World Health

Organization 1999) in its 'Laboratory manual for the examination of human semen (World Health Organization, 1999).

The appearance, color, thickness, and pH is noted. A pH test looks at the range from a very acid solution to a very alkaline solution(Joanna and Elington,2005).

The morphology of the sperm is also evaluated. With WHO criteria as described in the manual of 1999, a sample is normal if 30% or more of the observed sperm have normal morphology. The Tygerberg strict criteria for morpology assessment are recommended in the most recent WHO manual on semen analysis (WHO 1999).

#### **Results and discussion**



Figure- 1- the average of semen's volume and grade activity with durations of smoking in patients compared with control group

Cigarette smoking is associated with modest reduction in sperm parameters such as ,semen volume(figure-1-). Cigarette smoking associated with sub fertility in males and may result in decreased sperm concentration(figure -3-) lower sperm motility(figure -2-) and reduced percentage of morphologically normal sperm(figure -4-) respectively (Lewin *etal* . 1991;Sofikitis *etal* . 1995 ;Zinaman *etal* . 2000) . Smoking may cause sub fertility by influencing hormone levels (Vogt *etal* . 1986).There is a strong correlation between semen quality and fecundity is reported to rise with sperm concentration up to 40 million/ml ,as well as tobacco smoking impairs semen quality moderately and independently of exposure to tobacco smoke .The result seen not to be explained by confounding , selection of information bias(Zinaman *etal* . 2000).



Figure -2- the sluggish sperms ,immotile , and motile sperm with duration of smoking in patients compared with control group

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Immotile sperm also viewed in our study as well as sluggish (Vogt *etal.* 1986) figure -2-. The first thing that can cause low sperm motility is nutritional issues (Vine,1996) meanwhile, low sperm motility(figure -2-) can be caused by certain habits for example the use of tobacco, while it is more likely to cause other sorts of health problems, is thought to cause low sperm motility as well. (Sofikitis, *etal* 1995). Smoking adversely affects the semen quality of infertile men .In this study we observed a relationship between duration of smoking and several semen characteristics included sperm motility (Goverde, *etal* 1995). Smoking probably has an adverse effects during the fertilization that is damage in DNA of sperm (Goverde, *etal* 1995), so it can increase the number of morphological abnormalities(figure-4-) of spermatozoa results and impaired motility (Vogt *etal* 1986).



Figure -3- Average of sperm concentration in patients compared with control group

Unhealthy lifestyle habits including smoking may lead to lower sperm counts in men (Vine, 1999). Sperms are the male gamete cells that are needed for fertilization. Healthy sperm counts should be at least 20 million spermatozoa per milliliter of semen, with at least 70 percent of the cells alive at ejaculation and 30 percent of normal shape and size. If the sperm count is below a healthy amount(figure -3-), then fertilization is less likely (Zenzes,2000). The majority of men that suffer from infertility have a low sperm count (view that figure above) . Severe oligozoospermia was diagnosed when the sperm concentration was  $<5x10^6$ /ml and included men who had oligozoospermia alone or in combination with asthenozoospermia and or teratozoospermia. Having a low sperm count can be caused by many factors included stress, smoking and obesity (Lewin,1991).



Figure -4- abnormal sperm shape with duration of smoking in patients compared with control group

In relation to effects of smoking ,cigarette contain a lot of chemical components known as toxins that lead to defect in the testes can not produce adequate quality sperm cells (Augood, etal .1998). Chemical exposures and nicotine may reduce sperm count and morphological abnormal sperm in term of teratozoospermia. of cigarettes per day multiplied by the number of years of smoking )and semen quality has been assessedaswell(Vogt, etal. 1986)Figure-4-.

Tobacco is represented as a mutagen may elevate abnormalities in sperm shape(figure-4-) adversely affect fertility, the mechanism behind the harmful effect of smoking on semen quality

but a direct toxic effect of the many chemical is not fully understood(Vermeulen, 1993), components in the cigarette smoke on the germinative epithelium is a more likely explanation (Zenzes, 2000). Abnormal sperm cells contribute to an increase in the production of reactive oxygen species (ROS) and oxidative stress that further compromises normal spermatogenesis so that the main cause of oxidative stress associated with male infertility are smoking, aging, exogenous estrogens and others(Unity of oxidative stress 2002). Oxidants in cigarette smoke are thought to damage sperm DNA (deoxyribonucleic acid ), and smokers have more oxidative DNA damage in their sperm than do non- smokers. An association between cigarette smoking and sperm aneuploidy has also been observed (Vermeulen, 1993). A possible involvement of leukocytes, which were significantly elevated in our study(view the table) in smokers compared with non-smokers, was also reported in a previous investigation which may sign to an infection however inflammation associated with cigarette smoking (Close *et al.*, 1990). The mechanism, in the semen of smokers, is unclear(Parry etal 1997) .Smoking is one of the aggravating factors associated with idiopathic male infertility (Parry etal., 1997).



Figure -5- the average of liquefaction time with duration of smoking in patients compared with control group

Liquefaction time(figure-5-) it is also affected with nicotine of cigarette in that it may impact on acidphosphatase enzyme and protolytic fibrinolysin secreted from prostate that responsible for gel and liquefying semen(Vogt, *etal.*1986). In order to determine the percentage of men willing to reduce or stop smoking for the prospect of improved fertility, only men with idiopathic infertility and a sperm concentration of  $>5x10^6$ /ml were assessed in our study. (Sofikitis, *etal.* 1995). Higher testosterone and LH levels are shown in addition to higher LH/free testosterone ratios with increased smoking(Sofikitis,*etal.*1995). previous studies also observed augmented median FSH and inhibin B levels (not transformed or adjusted) with more smoking. In theory, in the hypothalamo–pituitary–gonadal system, an increase in FSH and LH will initially cause testosterone and inhibin B levels to rise and subsequently induce a decrease in FSH and LH by negative feedback in that tobacco smoke constituents may disrupt the normal function of this system dealing with, and we found evidence suggesting 'compensated Leydig cell failure' in smokers was found . (Vermeulen,1993).



Figure -6- Azoospermia with durations of smoking in patients compared with control group Associated with this results azoospermia (completely absence of sperm)and oligospermia (low sperm concentration ranged 10-20 million/ml)are common causes of male infertility .In figure -6-our results showed that 40 percent of(15-20) years duration of smokers are azoospermic males that may refer to abnormal hormonal levels. A possible explanation is that smoking over time may lead to a degeneration of Leydig cells, which in turn reduces testosterone production(Vermeulen,1993). Our data show that image content can have an impact on men's

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semen quality, Among subject patterns for sperm motility in men only few sperm showed linear progressive motility and whereas motility (large percent of sperm had impaired motility which denoted C and D or graded 1 and 2) (Lewin, *etal*. 1991) Figure -7-.





Figure-7- the average of grade activity of sperm with durations of smoking in patients compared with control group

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Ag	pus	Agg	Α	Abnorm	Normal	Grade	Sperm	Immotil	Slugg	sperm	Sperm	PH	viscosit	color	volu	Liq-	Abs	para
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37	0-1	-	-	35	65	3	80	10	10	80	85	Al	normal	grey	4	20	3	
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32	0-1	-	-	40	60	3	85	10	5	85	95	Al	=	=	4	20	3	
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27	0-1	-	-	30	70	3	80	10	10	80	95	=	=	=	4	20	3	rol
34	0-1	-	-	40	60	3	85	10	5	85	90	=	=	=	4	20	3	
22	0-1	-	-	40	60	3	90	5	5	90	85	=	=	=	4	20	3	
38	0-1	-	-	35	65	3	90	5	5	90	90	=	=	=	4	20	3	
44	0-1	-	-	30	70	3	80	5	15	80	80	=	=	=	4	20	3	
39	0-1	-	-	35	65	3	90	5	5	90	90	=	=	=	4	20	3	
41	0-1	-	-	25	75	3	80	10	10	80	95	=	=	=	4	20	3	
21	0-1	-	-	30	70	3	85	10	10	85	90	=	=	=	4	20	3	
45	8-10	-	-	35	65	2	50	40	10	50	35	=	=	=	3.5	30	3	
38	0-2	+	+	50	50	1	3	92	5	3	75	=	=	Red	1.5	20	4	
35	0-2	-	-	40	60	2	50	35	15	50	50	=	=	grey	3.5	20	4	
30	0-2	-	-	-	-	-	-	-	-	<u>0</u>	<u>0</u>	=	=	=	3	20	5	
35	2-4	+	+	30	70	2	65	30	5	65	90	=	=	=	2	40	4	(5-9)
24	1-3	+	+	40	60	2.5	40	50	10	40	80	=	=	yello	3	25	5	Year
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37	8-10	+	-	40	60	2	60	30	10	60	50	=	=	grey	2.5	30	4	king
33	-45	-	-	90	10	2	15	75	10	15	40	=	=	yello	3	20	3	mig

Table of smokers with their parameters of semen

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45	-55	-	-	35	65	2.5	50	40	10	50	60	=	=	grey	6.5	30	4	
	50																	
31	6-8	+	-	80	20	1.5	25	70	5	25	50	=	=	=	1.5	20	4	
40	4-6	-	-	50	50	1.5	28	44	28	28	1.4	=	=	=	1	25	3	
39	-17	-	-	45	55	2	25	15	65	25	15	=	=	=	4	20	4	(1.0
	15																	(10-
37	4-6	-	-	40	60	2	16	70	14	16	35	=	high	=	2.5	65	4	14) Veer
38	0-2	-	-	35	65	2.5	60	30	10	60	30	=	normal	=	2	25	5	rear
33	1-3	-	-	50	50	1	10	85	5	10	70	=	=	=	1	20	4	s smo
40	1-3	-	-	70	30	1.5	10	80	10	10	55	=	=	=	2	20	4	king
32	0-3	-	-	40	60	2	30	65	5	30	10	=	=	=	1	20	3	ming
37	0-1	-	-	60	40	1	10	80	10	10	20	=	=	=	1.5	20	3	
41	6-8	-	-	60	40	2	20	40	40	20	40	=	=	=	3.5	20	4	
37	0-1	-	-	-	-	-	-	-	-	<u>0</u>	<u>0</u>	=	=	=	5	20	4	
52	0-2	-	-	60	40	3	60	15	5	60	35	=	high	=	2	30	4	
35	2-4	-	-	70	30	1	12	70	18	12	3	=	normal	=	1.5	30	4	
37	0-1	-	-	-	-	-	-	-	-	<u>0</u>	<u>0</u>	=	=	=	2.5	20	5	
50	-20	-	-	50	50	2	30	65	5	30	6	=	=	yello	2.5	25	3	(15
	15													W				(13 - 20)
44	3-5	-	-	-	-	-	-	-	-	<u>0</u>	<u>0</u>	=	=	grey	0.5	20	4	20) Year
36	0-2	-	-	90	10	0	0	90	10	<u>0</u>	6	=	=	=	3	20	3	s s
36	1-3	-	-	-	-	-	-	-	<u>0</u>	<u>0</u>	<u>0</u>	=	=	=	2	30	4	smo
37	1-3	-	-	-	-	-	-	-	<u>0</u>	<u>0</u>	<u>0</u>	=	high	=	2	60	3	king
44	0-2	+	+	90	10	1	5	75	20	5	20	=	high	=	1.5	30	4	Ű
40	1-3	-	-	40	60	2	25	60	15	25	12	=	normal	=	2.5	20	5	

Liq = Lique faction time (min). Abs= Abstinence time. Ad = Aden aggregation. Agg = Sperm agglutination.

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تأثير التدخين بفترات مختلفة على بعض معايير الخصوبة للمرضى الوافدين إلى مركز العقم بمستشفى الصدر التعليمي في محافظة النجف الأشرف آلاء مهدي عبيد الخزعلي كلية العلوم | جامعة الكوفة

الخلاصة

أجريت هذه الدراسة في حزيران عام 2009 في مركز العقم في مستشفى الصدر التعليمي بمحافظة النجف الأشرف ، وكان الهدف منها دراسة تأثير التدخين على بعض معايير الخصوبة في الرجال وذلك من خلال تقييم السائل المنوي لأربعين عينة تعود لرجال ممن يدخنون بفترات مختلفة قسمت إلى ثلاث فترات سنوية وهي (5-9 ) سنة و (14-10) سنة و(15-02 ) سنة وتعني مدة التدخين بغض النضر عن عدد السكائر التي يدخنها الفرد باليوم إضافة إلى عينات السيطرة (غير المدخنين) وبواقع عشر عينات لكل منها بتلك العينات تم فحصها وتقييمها بموجب تقارير منظمة الصحة العالمية كما وتم متابعة كافة النتائج المستحصلة من تحليل السائل المنوي ومقارنتها بقيم السيطرة . أظهرت الدراسة إن المعايير النوعية للمني للنموذج الأخير من فترات التدخين هي أوطأ ومقارنتها بقيم السيطرة . أظهرت الدراسة إن المعايير النوعية للمني للنموذج الأخير من فترات التدخين هي أوطأ من سابقتها و هكذا بمعنى إن المعايير المنوية تقل مع ازدياد الفترة أو المدة السنوية التي يدخنها الرجل ولذا تبين من سابقتها و هذا بمعنى إن المعايير المنوية تقل مع ازدياد الفترة أو المدة السنوية التي يدخنها الرجل ولذا تبين على سابقتها و معذل بمعنى إن المعايير المانوية تقل مع ازدياد الفترة أو المدة السنوية التي يدخنها الرجل ولذا تبين على سابقتها و معنا معني إن المعايير المانوية تقل مع ازدياد الفترة أو المدة السنوية التي يدخنها الرجل ولذا تبين من سابقتها و معذا بمعنى إن المعايير المنوية تقل مع ازدياد الكلي والمظهر الخارجي وحركة النطف إضافة إلى حجم السائل المنوي ومعدل سيولته وهذا التأثير متمثل بالانخفاض الكمي والنوعي للمني والذي يعتبر مؤشر خطير للعقم في الرجال .