

## Assessment of Pathologic Correlation between Effects of Smoking on Male Infertility: An Institutional Based Study

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### ABSTRACT

**Background:** Infertility In humans accounts for 40-50% of infertility. The present study was conducted to evaluate effects of smoking and alcohol on the infertility level in males.

**Materials & Methods:** Subjects were divided into 2 groups of 30 each. Group I (control) - included 30 non smoker and group II- included 30 smoker subjects. Smokers were divided into- Light Smokers- 01-20 cigarettes/day; Moderate Smokers- 21-40 cigarettes/day and Heavy Smokers- 41 and more cigarettes/day. Parameters such as Asthenozoospermia (A), Teratozoospermia (T) and Oligozoospermia (O), were taken into consideration.

**Results:** Group I, group II had 30 patients each. 12 males were light cigarette smokers, 8 were moderate and 10 were heavy cigarette smokers. Maximum males were seen with A alone followed by A+O+T combination. When compared to group I, maximum males were A and A+O+T followed by A and O only.

**Conclusion:** Smoking had deleterious effect on the sperm level in males. Hence it should be considered to be the risk factor for infertility in males.

**KEYWORDS:** Infertility, Male, Smoking.

### INTRODUCTION

Infertility is typically defined as the inability to achieve pregnancy after one year of unprotected intercourse. It affects 10-15% of all couples. Infertility is a disease of the reproductive system that impairs the body's ability to perform the basic function of reproduction.<sup>1</sup> Although in some men a specific disorder may be present, in majority no apparent reason for infertility could be found. This has drawn attention to the impact of lifestyle and environmental factors, especially diet, obesity, smoking, alcohol intake, recreational drug use, and exposure to environmental toxins, on reproductive health of such men.<sup>2</sup>

Male infertility refers to a male's inability to cause pregnancy in a fertile female. In humans it accounts for 40-50% of infertility. It affects approximately 7% of all men. Male infertility is commonly due to deficiencies in the semen, and semen quality is used as a surrogate

measure of male fecundity. There is increasing evidence that the harmful products of tobacco smoking may damage the testicles and kill sperm, but their effect on male fertility is not clear. Some governments require manufacturers to put warnings on packets. Smoking tobacco increases intake of cadmium, because the tobacco plant absorbs the metal. Cadmium, being chemically similar to zinc, may replace zinc in the DNA polymerase, which plays a critical role in sperm production.<sup>3</sup> The present study was conducted to evaluate effects of smoking on the infertility level in males.

### MATERIALS & METHODS

This study was conducted in Department of Pathology, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh, India. It comprised of 60 subjects.

Subjects were informed regarding the study and consent was obtained. Patients information such as name, age etc was recorded.

Subjects were divided into 2 groups of 30 each. Group I (control) - included 30 non smoker. Group II- included 30 smoker subjects.

Semen samples were collected in wide-mouthed sterile containers, by masturbation, in the laboratory. Only one sample per patient was included in the study. All samples were kept at 37±2°C temperature and processed immediately after complete liquefaction.

All semen samples were analyzed for several semen parameters:

i) Liquefaction time, ii) Volume, iii) Viscosity.

Parameters such as Asthenozoospermia (A), Teratozoospermia (T) and Oligozoospermia (O), were taken into consideration. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

**RESULTS**

Group I and group II both have 30 patients each. Table I shows that 12 males were light cigarette smokers, 8 were moderate and 10 were heavy cigarette smokers. Maximum males were seen with A alone followed by A+O+T combination. When compared to group I, maximum males were A and A+O+T followed by A and O only.

**Table I: Semen Variables amongst Group I and Group II**

Diagnosis	Cigarette smokers			Total	Control (Group I)
	Light	Moderate	Heavy		
N	2	0	1	3	3
A	1	2	1	4	6
A+O	3	1	2	6	4
A+T	1	1	1	3	3
A+O+T	2	1	0	3	6
O	1	0	2	3	4
O+T	1	1	1	3	2
T	1	2	2	5	2
<b>Total</b>	12	8	10	30	30

**DISCUSSION**

Pre-testicular factors refer to conditions that impede adequate support of the testes and include situations of poor hormonal support and poor general health including. It has been observed that obesity increases the risk of hypogonadotropic hypogonadism. It causes leptin insensitivity in the hypothalamus, leading to decreased Kiss1 expression, which, in turn, alters the release of gonadotropin-releasing hormone (GnRH). Other factors such as undiagnosed and untreated coeliac disease (CD) may have reversible infertility.<sup>4</sup>

Nevertheless, CD can present with several non-gastrointestinal symptoms that can involve nearly any organ system, even in the absence of gastrointestinal symptoms. Thus, the diagnosis may be missed, leading to a risk of long-term complications. In men, CD can reduce semen quality and cause immature secondary sex characteristics, hypogonadism and hyperprolactinaemia, which causes impotence and loss of libido. Other factors such as drugs, alcohol, Strenuous riding, medications, including those that affect spermatogenesis such as chemotherapy, anabolic steroids etc play important role.<sup>5</sup> In our study we evaluated effect of smoking on infertility level of males.

For this study we involved 60 subjects and they were divided into 2 groups. Group I and group II all had 30 patients each. Researchers have variously concluded that toxins in cigarette smoke reach male reproductive system and their effects, though still under research, are mainly due to their direct interaction with seminal fluid components and the accessory glands, that contribute their secretions to the seminal fluid, leading to its increased viscosity, reduced seminal volume and delayed liquefaction time, hence reducing forward linear progression of spermatozoa, manifesting as asthenozoospermia.<sup>6</sup>

We found that 12 males were light cigarette smokers, 8 were moderate and 10 were heavy cigarette smokers. Maximum males were seen with A alone followed by A+O+T combination. When compared to group I, maximum males were A and A+O+T followed by A and O only. This is in accordance to Goverde et al.<sup>7</sup>

We found that heavy smokers had all three variants of sperms level. This is similar to the findings of Gopikrishnan K et al.<sup>8</sup>

Gaur DS et al assessed the impact of alcohol and smoking on semen quality of male partners of couples

seeking treatment for primary infertility. From the semen samples analyzed in our andrology laboratory, results of 100 alcoholics and 100 cigarette smoker males were studied following WHO guidelines and compared with 100 strict nonalcoholic and nonsmoker males for presence of asthenozoospermia, oligozoospermia and teratozoospermia. Only 12% alcoholics and six per cent smokers showed normozoospermia compared to 37 % nonalcoholic nonsmoker males. Teratozoospermia, followed by oligozoospermia dominated alcoholics. Overall impact of asthenozoospermia and teratozoospermia, but not of oligozoospermia, was observed in smokers. Light smokers predominantly showed asthenozoospermia. Heavy alcoholics and smokers showed asthenozoospermia, teratozoospermia as well as oligozoospermia. Asthenozoospermia, the most common semen variable in our study, can be an early indicator of reduction in quality of semen. Alcohol abuse apparently targets sperm morphology and sperm production. Smoke-induced toxins primarily hamper sperm motility and seminal fluid quality. Progressive deterioration in semen quality is related to increasing quantity of alcohol intake and cigarettes smoked.<sup>9</sup>

## CONCLUSION

Smoking has deleterious effect on the sperm level in males. Deterioration of sperm level in patients was seen in smokers.

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