EFFECT OF TOBACCO CHEWING ON SEMINAL PARAMETERS IN MALE PARTNERS OF INFERTILE COUPLES

ABSTRACT

Background: Male factors contribute to almost 50% of infertile couples. Deleterious effects of tobacco smoking on male reproductive system are well known. Research studies report contradictory findings about the effect of tobacco chewing on male fertility. Aim and objectives: To study effect of tobacco chewing on seminal parameters in male partners of infertile couples. Material and Methods: Present study was conducted on 100 male partners of infertile couples (50 tobacco chewers and 50 non-chewers) in age group of 21-40 years in the semen analysis laboratory in department of Physiology of Government Medical College, Nagpur from October 2014 to March 2016. Seminal parameters like volume of ejaculate, sperm count, sperm motility and motile sperm count were measured and compared in both groups. Result: Tobacco chewers had significantly lower values of all the seminal parameters as compared to non-chewers. Significantly low values of all parameters were observed in severe tobacco chewers as compared to mild and moderate tobacco chewers. Conclusion: Tobacco chewing has adverse effect on seminal parameters of male partners of infertile couples thus proving its pronounced role in male infertility. Severity of this effect increases as duration of tobacco chewing is prolonged.

KEYWORDS

Tobacco chewing, seminal parameters, male partners of infertile couples

INTRODUCTION

Reproduction is the necessity of life for the propagation of species. In spite of vast advances, there are many challenges of infertility. Male factors contribute to almost 50% of infertile couples while remaining other causes may be either due to a female factors or a combination of male and female factors [0]. Tobacco chewing constitutes one of the forms of smokeless tobacco. The habit of tobacco chewing is common among young age groups in India, China, and the south-east Asia region [1]. In India, chewing tobacco is systematically associated with socioeconomic markers at the individual and household level. Several carcinogens have been identified in smokeless tobacco; the tobacco-specific N-nitrosamine (TSNA), N-nitrosornicotine (NNN), and 4- (methylisoxazolino)-1-(3-pyridyl)-1-butanone (NNK) are the most important. NNN and NNK are formed from nicotine during curing, aging, and especially during fermentation [0]. Other compounds, such as 3 methylisoxazolinopropanaldehyde (MIPA), negatively affect DNA by causing single-strand breaks and protein crosslinks [0]. Detrimental effects of cigarette smoking on male fertility are well known [2]. Studies done in India report contradictory findings about effect of smokeless tobacco on male fertility. While some studies report adverse effects of smokeless tobacco on semen quality [4], other report non-significant effects [0]. Hence this study was taken to evaluate the relationship between tobacco chewing and sperm quality in male partners of infertile couples undergoing infertility evaluation.

MATERIAL AND METHODS

Present study was conducted on 100 male partners of infertile couples (50 cases and 50 controls) in age group of 21-40 years in the semen analysis laboratory in department of Physiology of Government Medical College, Nagpur from October 2014 to March 2016. Male partners of infertile couples thus proving its pronounced role in male infertility. Severity of this effect increases as duration of tobacco chewing is prolonged.

TABLE 1: Sperm density, Semen volume and Motility among tobacco chewers (Group T) and Controls (Group C):

| Variables                        | Group T | Group C |
|----------------------------------|---------|---------|
| Sperm Density Oligospermia (n=50) | 18      | 36      |
| Sperm Density Azospermia (n=50)  | 10      | 20      |
| Semen Volume (<1.5 ML) (n=50)    | 07      | 14      |
| Decreased Motility               | 20      | 20/40   |
|                                  | 0.5%    | 0.5/40  |

(Device T = tobacco chewers, Group C = Control)

(In group T, out of total 50 subjects, 10 are azospermic hence motility is observed only in 40 subjects)S

(In group C, out of total 50 subjects, 2 are azospermic hence motility is observed only in 48 subjects)S
Table 2: Distribution according to various semen quality parameter among tobacco chewers (Group T) and Controls (Group C):

| Variables       | Group C (n=50) | Group T (n=50) | P value | S/HS/NS |
|-----------------|----------------|----------------|---------|---------|
| Volume (ml)     | 3.60±0.81      | 3.35±0.63      | 2.71±1.08 | 2.48±0.98 | <0.0001 | S       |
| Sperm count/ml  | 48.47±27.80    | 43.80±28.51    | 40.14±34.36 | 38.03±37.27 | <0.0001 | HS      |
| Motile sperm count | 114.88±73.53 | 90.00±72.63    | 74.34±63.37 | 73.14±68.41 | <0.0001 | HS      |
| Motile sperm count % | 58.52±18.66 | 51.74±26.05    | 41.74±27.44 | 39.64±29.84 | <0.0001 | HS      |

(Statistically significant; HS = Highly significant; NS= Not significant)

**DISCUSSION**

Findings of our study suggests adverse effects of tobacco chewing habit on male fertility. Tobacco chewing has had significantly less values of all the studied parameters as compared to non-users. Mean Volume of ejaculate (ml) of controls was found to be 3.60 ± 0.81 ml while that of mild, moderate and heavy chewers was found to be 3.35 ± 0.63, 2.71 ± 0.88 and 2.48 ± 0.98 ml respectively. ANOVA test p value was 0.03 which is statistically significant (p < 0.05). Similar findings were obtained by Phatale S. et al [15] and Patel K. et al [16]. Mean Sperm count/ml(millions) of controls was found to be 48.47 ± 27.80 million while that of mild, moderate and heavy chewers was found to be 43.80 ± 28.51, 40.14 ± 34.36 and 38.03 ± 37.27 million respectively. ANOVA test p value was < 0.0001 which is statistically highly significant (p < 0.05). Our study thus indicates that heavy chewing cause significant decrease in sperm count. Many studies support our results; like Phatale S. et al [15] Parmar N. et al [16]. Nicotine the main alkaloid of tobacco is known to elevate the plasma epinephrine and this elevation stimulates the secretion of ACTH [14]. The adrenal cortical hyperactivity, resulting in induced stress, causes high level of catecholamines in the body, which is a known vasoconstrictor. Because of vasoconstriction as well as due to action of nicotine there occurs impairment of Leydig cell function. These alterations in steroidogenesis ultimately lead to decreased testosterone levels, which in turn causes disturbances in spermatogenesis leading to decrease in sperm count [13].

Mean Motile Sperm count in millions of controls was found to be 114.88 ± 73.53 million while that of mild, moderate and heavy chewers was found to be 90.00 ± 72.63, 74.34 ± 63.37 and 73.14 ± 68.41 million respectively. ANOVA test p value was < 0.0001 which is statistically highly significant (p < 0.05). Mean Percentage of Motile Sperms of controls was found to be 58.52 ± 18.66 % while that of mild, moderate and heavy chewers was found to be 51.74 ± 26.05, 41.74 ± 27.44 and 39.64 ± 29.84 % respectively. ANOVA test p value was < 0.0001 which is statistically highly significant (p < 0.05). Our study results are consistent with researchers like Patel K. et al [16] and Mankar S. et al [14], who showed the percentage of motile sperm and total sperm count were significantly lower (p < 0.05). Nicotine and other chemicals in tobacco probably cause either damage to mitochondrial genome or/and mitochondrial enzymatic activities or an impairment of function of the seminal vesicle affecting sperm motility [14].

**LIMITATIONS OF STUDY**

Only hospital cases were selected, hence representativeness of the sample may be questionable to some extent. Sample size of our study is small, so need to evaluate relationship of addiction (tobacco chewing) with infertility in larger sample size.

**CONCLUSION**

To summarize, it can be concluded that severity of infertility is more in tobacco chewers as compared to non-chewers. So there is definite relationship between tobacco chewing and infertility in males. As exposure period of tobacco chewing is prolonged, severity of its adverse effect also increases. Male partners of infertile couples should be counselled about the ill effects of tobacco chewing on sperm quality and advised to quit tobacco chewing for better reproductive health.

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**Conflict of Interest:** None declared.

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