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Original Research Article

Addiction to tobacco and alcohol in male partners of infertile couples: a descriptive study

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ABSTRACT

Background: In recent decades infertility has become a burdensome problem with its profound psychological, economic, demographic and medical complications. In an infertile couple male factor plays as much important role as that of female factor. Life style factors like addiction to tobacco, alcohol and drugs do have an effect on male fertility. The purpose of this study was to assess the effect of addiction to tobacco and alcohol in male partners of infertile couples in a tertiary care center.
Methods: This prospective cross-sectional study was undertaken in the department of obstetrics and gynecology, JIPMER, Pondicherry from June 2018 to October 2019. 440 male partners of infertile couples were included. The study participants were subjected to detailed history taking, examination and investigations to assess various parameters contributing to infertility.
Results: Semen abnormalities were noted in 78.2% of the study population, among which azoospermia (19.8%) was the most common type. Addiction to smoking and alcohol was noted in 25.7% and 18.2% respectively.
Conclusions: Smoking, alcohol intake and duration of addiction have a significant association with semen quality.

Keywords: Addiction, Male infertility, Semen analysis

INTRODUCTION

In recent decades, infertility has become a burdensome problem with its profound psychological, economic, demographic and medical complications. In an infertile couple male factor plays as much important role as that of female factor. Male's inability to result in pregnancy in a fertile female is defined as male infertility.[1] As 50% of causes of infertility is attributed to male factor, there has been a trend in the evaluation of both female and male partner simultaneously for infertility evaluation.[2] Although, there has been major improvement in evaluation and treatment of male factor infertility, some are vexing and not acceptable by some couples. Evidence over the past 35 years has shown a trend towards decline semen parameters, which could be attributed to various changing environmental and lifestyle factors. One of those life style factors, which was found to have effect on male fertility was addiction to tobacco and alcohol. Even though alcohol consumption in limited amount is socially acceptable, it does have an effect on male fertility.[3]

There were various mechanisms by which tobacco smoking was found to have an effect on semen quality.[4]

Figure 1 shows the potential mechanisms by which tobacco smoking exerts an effect on semen quality.

Figures 2, 3 and 4 shows the effects of smoking and alcohol intake on spermatogenesis.[3]

The purpose of this study was to assess the lifestyle factors like addiction to smoking and alcohol in male partners of infertile couples in a tertiary care center in south India.

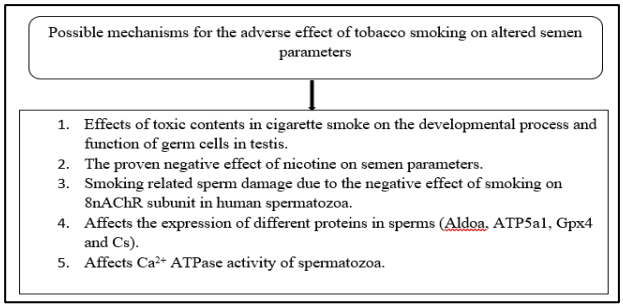

Figure 1: Mechanism by which tobacco smoking affect semen quality.

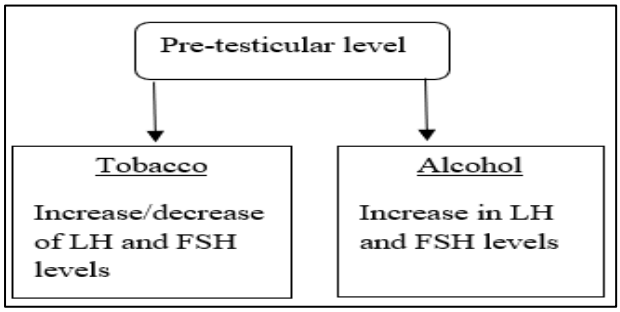

Figure 2: Effect of tobacco and alcohol on pre testicular level.

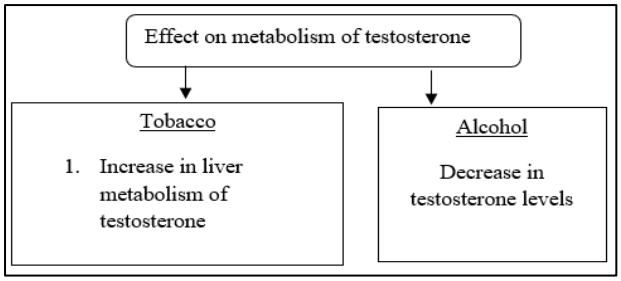

Figure 3: Effect of tobacco and alcohol on metabolism of testosterone.

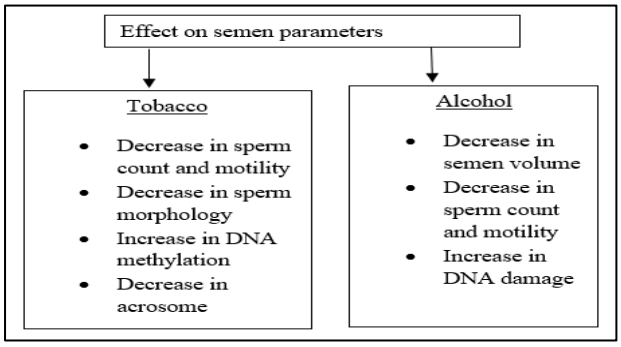

Figure 4: Effect of tobacco and alcohol on semen parameters.

METHODS

The present cross-sectional study was conducted in the department of obstetrics and gynecology, JIPMER, Pondicherry from June 2018 to October 2019 after the institutes ethical committee clearance.

A minimum sample size of 300 was calculated by reviewing the previous attendance records of male partners who attended the infertility clinic.

The study enrolled 440 infertile couples during the study period.

After a getting a written informed consent, all participants were subjected to detailed history taking by use of pre-structured performa followed by detailed physical examination. A baseline semen analysis was done, and if it was abnormal, they were advised to repeat the semen analysis after 2-4 weeks. If the repeat semen analysis report was abnormal, they were advised to undergo further investigations like hormonal analysis based on history and examination findings.

Statistical analysis was done using SPSS software 20 version. The distribution of categorical variables was expressed in terms of frequency and percentage. The distribution of continuous variables was expressed in terms of mean with standard deviation or median with a range based on the distribution of data. The association of factors contributing to infertility with clinical characteristics was carried out using Chi-square test/Fischer's exact test. All the statistical significance was carried out at 5% level of significance with p value <0.05 as significant.

RESULTS

Demographic characteristics

Epididymal and vas deferens abnormalities were noted in 4.8% and 3.4% abnormalities respectively. CBAVD was noted in 7 cases. Sexual dysfunction was noted in 18.9% (N=83) of the cases in which erectile dysfunction (10.2%) was the most common type followed by premature ejaculation.

Table 1: Demographic characteristics of the study population.

Demographic characteristics	Study result
Mean age in years	34.23±5.18
Mean duration of infertility (years)	6.07±3.63
Normal BMI	44.4%
Overweight	52.2%
Obese	3.4%
History of mumps orchitis	0.7%
History of Scroto-perineal surgeries	2.7%
Varicocele	10.7%
Diabetes	3.4%
Hypertension	3%
Hypothyroidism	0.9%

Addiction

Addiction to smoking was noted in 25.7% (N=113) and alcohol intake in 18.2% (N=80) cases. Addiction to both smoking and alcohol was noted in 14.8% (N=65) cases.

Table 2: Percentage distribution of duration of addiction.

Duration of addiction (years)	Alcoholics (N=80) (%)	Smokers (N=113) (%)
<5	50 (62.5)	65 (57.5)
5-10	21 (26.3)	44 (38.9)
≥10	9 (11.2)	4 (3.5)

Semen analysis findings

On initial analysis, 78.2% had abnormal semen report. When semen analysis was repeated, only 261 males underwent repeat analysis among which 85.8% had abnormal semen report.

Serum hormonal parameters

Those in whom serum hormonal levels were estimated, hyper gonadotrophic range of serum FSH and LH levels were observed in 17.2% and 25% of men respectively. Hypothyroidism and hyperprolactinemia were noted in 15.3% and 3.8% of men respectively. Hypo gonadotrophic levels of testosterone was noted in 32.9% of the cases.

Table 3: Percentage distribution of semen analysis report.

Semen analysis report	Initial analysis (N=440) (%)	Repeat analysis (N=261) (%)
Normozoospermia	96(21.8)	37(14.2)
Oligozoospermia	24(5.5)	18(6.9)
Asthenozoospermia	41(9.3)	24(2.6)
Teratozoospermia	13(3)	2(0.07)
Oligoasthenozoospermia	16(3.6)	9(3.4)
Oligoteratozoospermia	6(1.4)	6(2.3)
Asthenoteratozoospermia	75(17)	54(20.6)
Oligoasthenoteratozoospermia	33(7.5)	25(9.6)
Severeoligozoospermia	32(7.3)	29(11.1)
Cryptozoospermia	17(3.9)	6(2.3)
Azoospermia	87(19.8)	51(19.5)

Association between addiction and semen analysis

Duration of addiction was associated with abnormal sperm motility which was statistically significant.

Table 4: Association between semen parameters and addiction to smoking and alcohol.

Abnormal semen report	Smoker (%)	P value	Alcoholic (%)	P value	Both smoker and alcoholic (%)	P value
Hypospermia	25	>0.05	20	>0.05	18	>0.05
Acidic ejaculate	24	>0.05	12	>0.05	6	>0.05
Oligozoospermia	39	<0.05	26	>0.05	21	>0.05
Asthenozoospermia	33	<0.05	24	<0.05	21	<0.05
Teratozoospermia	32	>0.05	12	<0.05	24	<0.05

DISCUSSION

The overall prevalence of infertility in India is 3.9-16.8%. The rate varies among states like 3.7% noted in Maharashtra, Himachal Pradesh and Uttar Pradesh, 5% in Andhra Pradesh and 15% in Kashmir.[5] Among the causes of infertility 40% is attributed to male factor.[6] Male infertility is commonly due to deficiencies in the semen. So semen quality is used as a surrogate marker of male infertility.[1] Male infertility can result from causes related to hypothalamo-pituitary gonadal axis or testicular abnormalities and post testicular ejaculatory duct pathologies.[7] Though many studies have stressed the role of evaluation of male infertility, there are no interventional studies done to prove the real harmful effects of preventable factors like, tobacco smoking, alcohol intake, sedentary life style, recreational drug abuse and other environmental stresses on male fertility due to ethical reasons.[3]

In the present study entitled, assessment of addiction to tobacco and alcohol in male partners of infertile couples, 440 cases were studied. Several noteworthy factors were identified.

Demographic characteristics

Demographic characteristics like age at presentation, duration of infertility, presence of overweight, history of smoking and alcohol intake, history of surgeries related to the genitourinary system are comparable to other studies.

Table 5: Demographic characteristics noted in few studies related to male infertility.

Demographic characteristics	OmoAghoja et al[8]	Trilok et al[9]	Punab et al[10]	Makhadumsab et al[11]	Current study
Mean age in years	34.98±4.67	33.38±5.63	33.2±7.3	34.44±0.21	34.23±5.18
Mean duration of infertility	4.5±2.17	-	3.1±3.1	-	6.07±3.63
Normal BMI	27.9%	42.6%	17.6%	-	44.4%
Overweight	56.6%	46%	60.4%	-	52.2%
Obese	14.9%	10%	22%	-	3.4%
History of mumps orchitis	-	3.1%	1%	-	0.7%
History of smoking	-	35.1%	-	18.28%	25.7%
History of alcohol intake	-	18.1%	-	13.42%	18.2%
History of scrotoperineal surgeries	-	3.9%	4.3%	7.9%	2.7%
Varicocele	-	3.1%	35.4%	-	10.7%
History of comorbidities	-	7.2%	24.4%	-	5.5%

Sexual dysfunction

In our study, erectile dysfunction is the most common type (10.2%) of sexual dysfunction seen among the study participants, which is found to be associated with abnormal sperm morphology.

Similarly, another cross-sectional study involving 448 males found a significant association between the prevalence of erectile dysfunction (18.3%) being the most common type of sexual dysfunction and the occurrence of seminal abnormalities.[12]

Semen analysis

Only 21.8% of the current study population had normozoospermia, when compared to other studies, this could be due to the preferential referral of severe male factor infertility cases to the tertiary care centre for management.

Table 6: Semen analysis report noted among studies.

Seminal parameter	OmoAghoja et al[8]	Trilok et al[9]	Makhadumsab et al[11]	Current study
Normozoospermia	33.5%	77.85%	-	21.8%
Oligozoopsermia	22.8%	5.96%	3.93%	5.5%
Asthenozoopsermia	7.3%	19.76%	30.09%	9.3%
Teratozoospermia	11.5%	5.8%	7.17%	3%
Oligoasthenozoospermia	2%	-	-	3.6%
Oligoteratozoospermia	2.8%	-	-	1.4%
Asthenoteratozoospermia	2.5%	-	16.20%	17%
Oligoasthenoteratozoospermia	2.5%	-	4.16%	7.5%
Azoospermia	11%	16.18%	21.75%	19.8%
Cryptozoosermia	-	-	-	3.9%
Severeoligozoopsermia	-	-	16.66%	7.3%

Table 7: Results of various studies on the effect of smoking on semen parameters.

Author	Year	Study type	Number of participants	Sperm motility	Sperm concentration	Sperm morphology
Kunzle et al[13]	2003	Prospective	1786	Yes	Yes	Yes
Pravesh et al[14]	2019	Prospective	10,823	No	Yes	Yes
Cologar et al[13]	2007	Prospective	101	Yes	Yes	Yes
Liu et al[13]	2010	Prospective	147	Yes	Yes	Yes
Zhang et al[13]	2000	Prospective	362	Yes	Yes	Yes
Ochedalski et al[13]	1994	Prospective	70	Yes	yes	No
Current study	2019	Prospective	440	Yes	yes	No

Smoking

Table 7 shows the results of various studies conducted to know the effect of smoking on semen parameters.[13]

One meta-analysis conducted involving 16 studies to know the impact of smoking on seminal parameters revealed that, smoking has an adverse effect on sperm count and morphology, but has no effect on seminal volume, sperm motility, and serum hormonal levels.[13] Our study revealed that smoking had an adverse effect on sperm concentration and motility, but no effect on sperm morphology (Table 7). And this finding is almost consistent with other studies.

Alcohol intake

The detrimental effect of alcohol intake on semen volume and sperm morphology has been proved in one metanalysis involving 16,395 men. It was also found that harmful effect of moderate to heavy alcohol intake on sperm motility and morphology is dose dependent.[15] Another study conducted by Muthusami et al in 2005 found that chronic alcohol intake is associated with decreased semen volume, sperm count, motility and morphology. A metanalysis involving 29,914 participants in 2011 also found a significant association between alcohol intake and semen volume, sperm motility and morphology.[3] It has also been revealed that alcohol intake has a negative effect on serum testosterone levels, testicular volume, and causes an increase in serum FSH, LH and E_2 levels in chronic alcoholics.[3]

In the current study, a significant association was noted between alcohol intake and sperm motility and morphology, but no association was noted with sperm concentration. These findings are comparable to other studies.

There are many other preventable factors for male factor infertility like sedentary life style leading to overweight and obesity, stress related to environment and occupation, recreational drug use.

Ours was a prospective descriptive study which was limited by bias due to recall and unwillingness of some to share personal information regarding addiction due to social reasons. We couldn't exactly assess the extent and severity of addiction because of time constraints and ethical reasons

CONCLUSION

Our study is one of the first to report detrimental effect of addiction to smoking and alcohol intake on male fertility in south Indian population. Although there are many advances in evaluation and treatment modalities for male infertility, they are vexing for some couples. "Prevention is better than cure" concept holds good for male infertility due to lifestyle factors like addiction and sedentary lifestyle. It is better advisable to stop smoking and alcohol intake in couples coming for infertility treatment to increase the chances of natural conception.

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