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Original Research Article

To analyse the semen for various parameters with special reference to lifestyle factors

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ABSTRACT

Background: Male factor is responsible for infertility in 23% cases. Semen analysis is the cornerstone of infertility evaluation as it provides information on the functional status of seminiferous tubules, epididymis and accessory sex glands. Reports in recent years has shown that incidence of male infertility has increased as a result of various factors such as lifestyle, environmental pollution and stress.
Methods: This prospective study was conducted on patients reporting for semen analysis in Department of Pathology, Subharti Medical College. The duration of the study was from October 2014 to September 2016 with a study sample of 196 cases. Semen analysis was done by manual method according to WHO 2010 criteria.
Results: According to fertility scoring, out of 196 cases, 51 (26%) were infertile cases. With respect to infertile cases 82.4% were alcoholic, 80.4% tobacco smokers, 25.5% were tobacco chewers. These results were statistically significant. Out of 45 cases of oligozoospermia 37 (82.2%) were alcoholic, 36 (80%) were tobacco smoker and 10 (22.2%) were tobacco chewers. Out of 54 cases of asthenozoosperma 38 (70.4%) were alcoholic, 37 (68.5%) were tobacco smoker and 11 (20.4%) were tobacco chewers.
Conclusions: Alcohol consumption, tobacco smoking and tobacco chewing have a significant negative effect on the process of spermatogenesis, ultimately affecting sperm concentration, viability and motility. Hence clinician and fertility counselors need to be more focused to control infertility by modifying the life style factors.

Keywords: Infertility, Lifestyle, Semen Analysis

INTRODUCTION

Semen analysis is the cornerstone of infertility evaluation as it provides information on the functional status of seminiferous tubules, epididymis and accessory sex glands.[1] Reports in recent years has shown that incidence of male infertility has increased as a result of various factors such as lifestyle, environmental pollution and stress. Alcohol abuse in men has been reported to cause impaired testosterone production, and atrophy of testes, which can result in impotence, infertility and reduced male secondary sexual characteristics.[2-4] Tobacco consumption is one of the lifestyle factors that is often detrimental to human health as a whole.[5] Use of cell phones also adversely affects the quality of semen. Leydig cells, seminiferous tubules and spermatozoa are the main targets of the damage by mobile phones on reproductive tract.[6-8] This study aims to evaluate the impact of these life style cell factors on specific aspects of fertility and semen quality.

METHODS

This prospective study was conducted on 196 patients who reported for semen analysis in Department of Pathology, Subharti Medical College. The duration of the

study was from October 2014 to September 2016. Strict exclusion criteria were used since we aimed to study the impact of alcohol consumption, tobacco smoking, tobacco chewing and use of cell phone.

Following strict abstinence of two to six days, samples were collected in a wide mouthed sterile container by masturbation, in the laboratory. All samples were kept at normal room temperature and processed immediately after complete liquefaction and examined as per WHO 2010 guidelines. All semen samples were analysed for 10 primary semen parameters- volume, liquefaction time, sperm concentration, viability, progressive motility, viscosity, particulate matter, agglutination, normal spermeation and headless sperm. Individual parameters were assessed according to WHO 2010.[9]

The results obtained in the study are presented in tabulated manner in Microsoft Word Excel. Data analysis was done by Statistical Package for the Social Sciences (SPSS) version 19. The Statistical analysis was done by using chi-square test. P-value<0.05 was considered as statistically significant and P-value<0.01 was taken as highly significant while P-value>0.05 was regarded as non-significant.

RESULTS

In our study, out of 196 cases there were 131 (66.8%) fertile and 51 (28.6%) infertile cases. The sub fertile were 9(4.6%). The age ranged from 19 year to 50 year. Maximum 127 (64.8%) cases were in age group of 19-30 years. In the infertile cases, 42 (82.4%) cases were alcoholic, 41 (80.4%) cases were tobacco smokers and 13 (25.5%) were tobacco chewers. These findings were statistically significant (Table 1-3).

Majority of cases of oligozoospermia and asthenozoospermia were associated with alcohol consumption and tobacco smoking. Out of 45 cases of oligozoospermia 82.2% cases were alcoholics and 80% tobacco smoker. Out of 54 cases of asthenozoospermia 70.4% cases were alcoholics and 68.5% tobacco smoker. Similarly, out of 39 cases of oligoasthenozoospermia 84.6% were alcoholics and 82.1% were tobacco smoker (Table 4).

Table 1: Association of alcohol consumption with fertility score.

Fertility score	Alcohol consumption		
	Present	Absent	Total
Fertile	22 (16.8%)	109 (83.2%)	131(100.0)
Sub fertile	3 (33.3%)	6 (66.7%)	9 (100.0)
Infertile	42 (82.4%)	9 (17.6%)	51(100.0)
Indeterminate*	1 (20.0%)	4 (80.0%)	5 (100.0)
Total	68 (34.7%)	128 (65.3%)	196 (100.0)

χ^2- Value= 69.29; P value<0.001(SIG.); * Cases in which semen did not liquefy.

Table 2: Association of tobacco smoking cases with fertility score.

Fertility score	Tobacco smoking					
	Present		Absent		Total	
	Fre	%	Fre	%	Fre	%
Fertile	22	16.8	109	83.2	131	100.0
Sub fertile	2	22.2	7	77.8	9	100.0
Infertile	41	80.4	10	19.6	51	100.0
Indeterminate*	1	20.0	4	80.0	5	100.0
Total	66	33.7	130	66.3	196	100.0

χ^2- Value= 66.72; P value<0.001 (SIG.) * Cases in which semen did not liquefy.

Table 3: Association of tobacco chewing case with fertility score.

Fertility score	Tobacco chewing					
	Present		Absent		Total	
	Freq	%	Freq	%	Freq	%
Fertile	5	3.8	126	96.2	131	100.0
Sub fertile	1	11.1	8	88.9	9	100.0
Infertile	13	25.5	38	74.5	51	100.0
Indeterminate*	1	20.0	4	80.0	5	100.0
Total	20	10.2	176	89.8	196	100.0

χ^2- Value= 19.26; P value<0.001 (SIG)* Cases in which semen did not liquefy.

Table 4: Various semen variables.

Semen variable	Number	Percentage
Oligozoospermia	45	23.5
Arthenozoospermia	54	27.5
Oligoasthenozoospermia	39	20
Azoospermia	06	3.1
Normozoospermia	131	73.4

DISCUSSION

Of the myriad of factors that have been blamed for influencing the semen quality, life style factors like alcohol consumption, tobacco smoking and tobacco chewing have attracted much attention in recent time all over the world. In our study, out of 196 cases that were studied 66.8% as per fertility score were fertile. The sub fertile group had 4.6% cases and infertile group had 28.6% cases. Our study had 3.1% cases of Azoospermia, 23.5% cases of oligozoospermia and 73.2% cases of normozoospermia. Our study had 27.5% cases of asthenozoospermia. These findings corroborated well with other studies on sperm concentration and sperm motility (Table 6).

There is significant relationship between alcohol consumption and infertility. The negative association between alcohol intake and semen quality may be attributed to a direct adverse effect of alcohol on spermatogenesis or it may be a result of differences in lifestyle, health behavior and diet found among high alcohol consumers despite adjustment for these factors.

Study by Kumar et al on 240 male partner of couple consulting for infertility problem found deterioration in sperm count, total progressive motility and normal sperm morphology among alcohol consumption.[10] Due study showed association of alcohol with 82.2% oligozoospermic and 70.4% asthenozoospermia. Similar study by Gaur et al on 100 alcoholic showed oligozoospermia was much higher amongst alcohol cases (n=51), than controls, indicating progressive damage to testes in direct relation to increasing daily alcohol intake.[11] These studies showed lesser association of asthenozoospermia as compared to oligozoospermia.

Table 5: Association of lifestyle factors with various semen variables.

Semen variable	Alcohol consumption %		Tobacco smoking %		Tobacco chewing %	
	Present	Absent	Present	Absent	Present	Absent
Oligozoospermia (45)	82.2	17.8	80	20	22.2	77.8
Asthenozoospermia (54)	70.4	29.6	68.5	31.5	20.4	79.6
Oligoasthenozoospermia (39)	84.6	15.4	82.1	17.9	25.6	74.4
Azoospermia (06)	83.3	16.7	83.3	16.7	50	50
Normozoospermia (131)	16	84	16.8	83.2	3.05	96.9

Table 6: Variation in sperm concentration and motility.

Studies comparison	Azoospermia	Oligozoospermia	Normozoospermia	Asthenozoospermia	Normal
Our study	3.1%	23.5%	73.2%	27.5%	72.5%
Khushbu et al[68]	5.7%	25.1%	69.2%	38.7%	61.3%
Jagoo et al[70]	--	25%	75%	35%	65%
Kumar et al[71]	7.9%	26.3%	65.8%	36.7%	63.3%

Thus, alcohol induced reduction in levels of testosterone, LH and FSH not only hamper their normal morphological development and maturation of spermatozoa, it slows down the sperm production by testicular germ cells, especially in alcoholic.

Present study showed smoking was associated with 16.8% fertile population as compared to 22.2% sub fertile and 80.4% of infertile population. There is a strong association of cigarette smoking with infertility in our study.

In study by Kumar et al, among the oligozoospermia subjects, there was a non-significant lowering of sperm count and total progressive mobility between smoker and non-smokers.[10] Study by Ramlau Hansen et al showed deleterious effect of tobacco smoking on semen parameter.[12] Present study showed association of cigarette smoking with 80% oligozoospermia and 68.5% Arthenozoospermia case.

Similar studies by gaur et al showed higher number of oligozoospermia in smokers as compared to nonsmoker.[11] In these study asthenzoospermia was the most dominant semen variable contributing to the semen quality of smokers.

With respect to Tobacco chewing - 10.21% cases were tobacco chewers. Our study showed tobacco chewing was associated with 3.8% fertile population as compared to 11% sub fertile and 25.5% infertile population. Present study showed association of tobacco chewing with 22.2% oligozoospermias and 20.4% asthenozoospermia. The relationship between tobacco chewing and male infertility remain unclear and data specifically addressing this issue are scanty. Kumar et al in their study found oligoasthentetratozoospermia was significantly high among in chewers as compared to non-chewer.[10]

Said et al have reported an increasing trend of oligoasthenotetrazoospermia from mild to moderate to severe with respect to addiction of tobacco chewing.[13] Life style factors play an important role in the aetiology of various diseases and have also been implicated to cause reproductive impairment. In present study sperm concentration, progressive motility and viability was much lower in subjects exposed to life style factors like alcohol consumption, tobacco smoking and tobacco chewing.

In present study, statistical significance was determined between life style factors like alcohol consumption, tobacco smoking and tobacco chewing and infertile cases. Our results corroborated well with other studies like ones by Gaur et al, Khushbu et al and Kumar et al (Table 6).[10,11,14] Hence it is evident that alcohol consumption, tobacco smoking and tobacco chewing have a significant negative effect on the process of spermatogenesis, ultimately affecting sperm concentration, viability and motility. Hence clinician and fertility counselors need to be more focused to control infertility by modifying the life style factors.

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