

Original Research Article

Study of lifestyle factors leading to male subfertility - a prospective observational study

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Abstract

Context: In recent days, the inability to conceive is a common problem. Reason can either be due to female or male factor infertility. Lifestyle associations such as consumption of alcohol, tobacco smoking and chewing are few of the most discussed subjects of male infertility. **Aims:** The aim was to prove the association of semen quality (sperm count and motility) of male subjects indulging in alcohol consumption, tobacco smoking and tobacco chewing and its detrimental effects on sperm parameters of such patients. **Settings and Design:** This prospective study was conducted in and around of our institute, during the period of SEP 2018 to SEP 2019. **Materials and Methods:** A total number of 242 cases, aging between 18 to 50 years, were included and subjected for semen analysis by using manual method according to World Health Organization 2010 criteria and also put through a validated questionnaire about lifestyle practices and health status. Data analysis was performed by Statistical Package for the Social Sciences version 19. **Results:** Out Of 242 samples, 145(59.91%) cases were between the ages of 18 and 30 years. Present study reported that normozoospermia, oligozoospermia and azoospermia were in 71.90%, 21.48% and 06.61%, respectively. Out of 52(21.48%) sample of oligozoospermia, 40(76.92%) subjects were alcoholic, 29 (55.76%) men were tobacco smokers and 10 (19.23%) men were in indulged tobacco chewing. A total of 84 (34.71%) out of 242 samples manifested reduced sperm motility, of which 56 (66.66%) patients were enslaved to alcohol consumption. **Conclusion:** This study indicates that male fertility parameters are adversely affected by negative influences of lifestyle factors. Therefore, before the attempt to conceive, it is advisable to modify lifestyle habits discussed in the present study that helps supervise and manage their own fertility potential.

Keywords: Infertility, lifestyle factors, sperm count, sperm motility.

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Introduction

Infertility is a humongous medical and social problem, posing a cosmic burden on the society as it is an principal issue for both sexes because it is an instinctive biologic behavior to have an offspring, but also an important subject to be a family as a part of a community and a male contribution is involved in 20-70% of infertility stricken couples. Research into male factors is minimal, allowing myths to proliferate and an undercurrent of placing responsibility on the female side.[1,2]

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Our social idea of masculinity and being a man are all about someone who is sexually active and virile, and we can amalgamate and confuse fertility with virility. The diagnosis of male infertility relies largely on conventional semen analysis, and its interpretation has a profound influence on subsequent management of patients, Semen analysis is the non-invasive and cornerstone and mainstay method for direct evaluation, acquire information regarding functional status of seminiferous tubules, epididymis and accessory sex glands and the probing into the relationship between exposure to environmental agents and fertility.[1,6]

As a man's fertility depends on the quantity and quality of his sperm, semen analysis is generally used as the proxy to estimate fertility or becomes a window into the underlying reasons for infertility. Male reproductive impairment might result from factors that affect sperm

production, quality, function, or transport. Although in most men the origin of infertility remains unexplained, genetic causes are increasingly being discovered and investigated.[4,5]

Infertility is defined as inability to achieve conception in a period of one year in a couple, despite regular and adequate unprotected sexual intercourse. A male is said to be infertile if he is unable to impregnate his partner after one year of unprotected intercourse.[1,2]

There are numerous factors affecting reproductive system, and some might be beyond Patient's control, such as medical issues, nutrition, weight, exercise, psychological stress. Deteriorating effects of lifestyle associated factors have also been documented.[3]

Along with problems of liver, respiratory and cardiovascular system, alcohol and tobacco consumption are closely known deleterious factors for reproductive health causing low sperm count, sperm motility and sperm fertilizing capacity by increased seminal oxidative stress and DNA damage.[4,5]

Tobacco contains noxious carcinogen such as nicotine, carbon monoxide, nitrogen oxide and cadmium, which directly affects male and female gametes and embryos ultimately contributing a great deal to Male factor infertility.[6]

This prospective study highlights the potential risk and complications of alcohol and tobacco smoking or chewing on semen and the need for early attention to avoidable or remediable causes.

Materials and methods

This prospective observational study took place in T.M.M.C & RC, Moradabad between SEP 2018 and SEP 2019 comprised 242 patient visited in Department of obstetrics and gynaecology. Clinically infertile men with a history of infertility persisting longer than 1 year and lifestyle factors that affect assisted reproduction were enrolled in the present study. The patients who were detected with a history of systemic disease,

drug use, inguinal or testicular surgery, varicocele, undescended testis and hypoplastic testis at physical examination were excluded from this study. The study protocol was approved by the institutional ethical committee. Participants were questioned regarding their alcohol consumption, smoking habits and tobacco chewing. Informed written consent was obtained from each patient. After 3 days of sexual abstinence, semen samples were obtained by masturbation in a sterile and wide mouthed container. Samples were kept at normal room temperature and processed immediately after complete liquefaction, and routine semen analysis was carried out according to the World Health Organization (WHO) guidelines. The results were categorized on the basis of sperm count and motility: normozoospermia, oligozoospermia, azoospermia and asthenozoospermia. Data were analyzed using the Statistical Program for Social Science software 19.

Results

Total 242 cases of clinically diagnosed male infertility were included in this study.

The ranges of age group were 18 to 50 years. Most of the patients were between the ages of 18 and 30 years (N=145;59.91%) followed by 31 to 40 (N= 62;25.61%) and 41 to 50 years (N=35;14.46%) [Table 1].

Majority of cases were of normozoospermia (N = 174; 71.90%). A total of 68 patients showed low sperm count, out of which 52 (21.48%) were of oligozoospermia and 16 (06.61%) were of azoospermia [Table 2].

Out of 52 case of oligozoospermia, 76.92% patients were alcoholic, 55.76% were tobacco smokers and 19.23% were tobacco chewers. Out of sixteen patients of azoospermia, 75% were alcoholic [Table 3]. Out of 84 cases of asthenozoospermia, 66.66% cases were alcoholics, 58.33% were tobacco smokers and 29.76% were tobacco chewers.

Table 1 : Distribution of cases (N=242) according to age

Age	No. of cases	Percentage %
18-30	145	59.91
31-40	62	25.61
41-50	35	14.46
Total	242	100

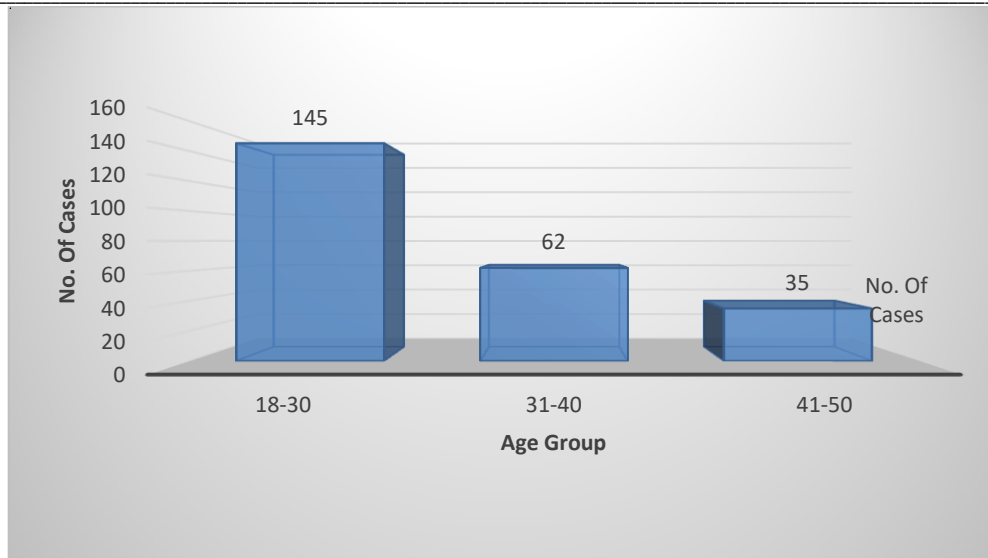


Fig. 1: Showing distribution of cases according to age

Table 2: Various semen variables and distribution of cases (N=242)

Semen Variable	Number	Percentage
Normospermia	174	71.90
Oligospermia	52	21.48
Azoospermia	16	6.61
Asthenospermia	84	34.71

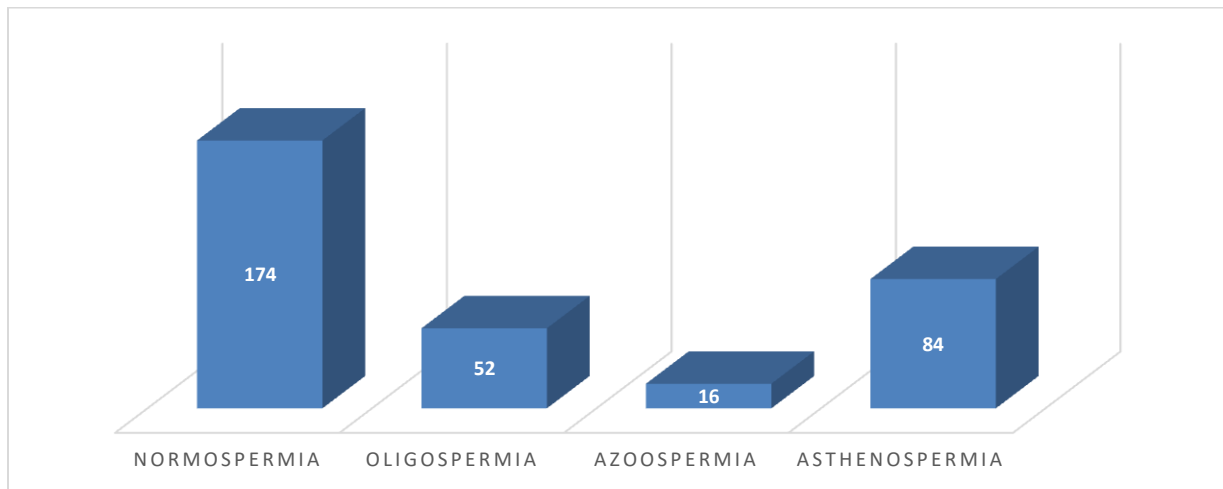


Fig. 2: Various Semen Variables and Distribution of cases

Table 3 : Association of lifestyle factors with various semen variables

Types	No. of cases	alcohol		Tobacco smoking		Tobacco smoking	
		Present	Absent	Present	Absent	Present	Absent
Normozoospermia	174	56 (32.18%)	118 (67.81%)	73 (41.95%)	101 (58.04%)	12 (06.89%)	162 (93.10%)
Oligozoospermia	52	40 (76.92%)	12 (23.07%)	29 (55.76%)	23 (44.23%)	10 (19.23%)	42 (80.76%)
Azoospermia	16	12 (75%)	4 (25%)	14 (87.5%)	2 (12.5%)	5 (31.25%)	11 (68.75%)
Total	242	108 (44.62%)	134 (55.37%)	116 (47.93%)	126 (52.06%)	27 (11.15%)	215 (88.84%)

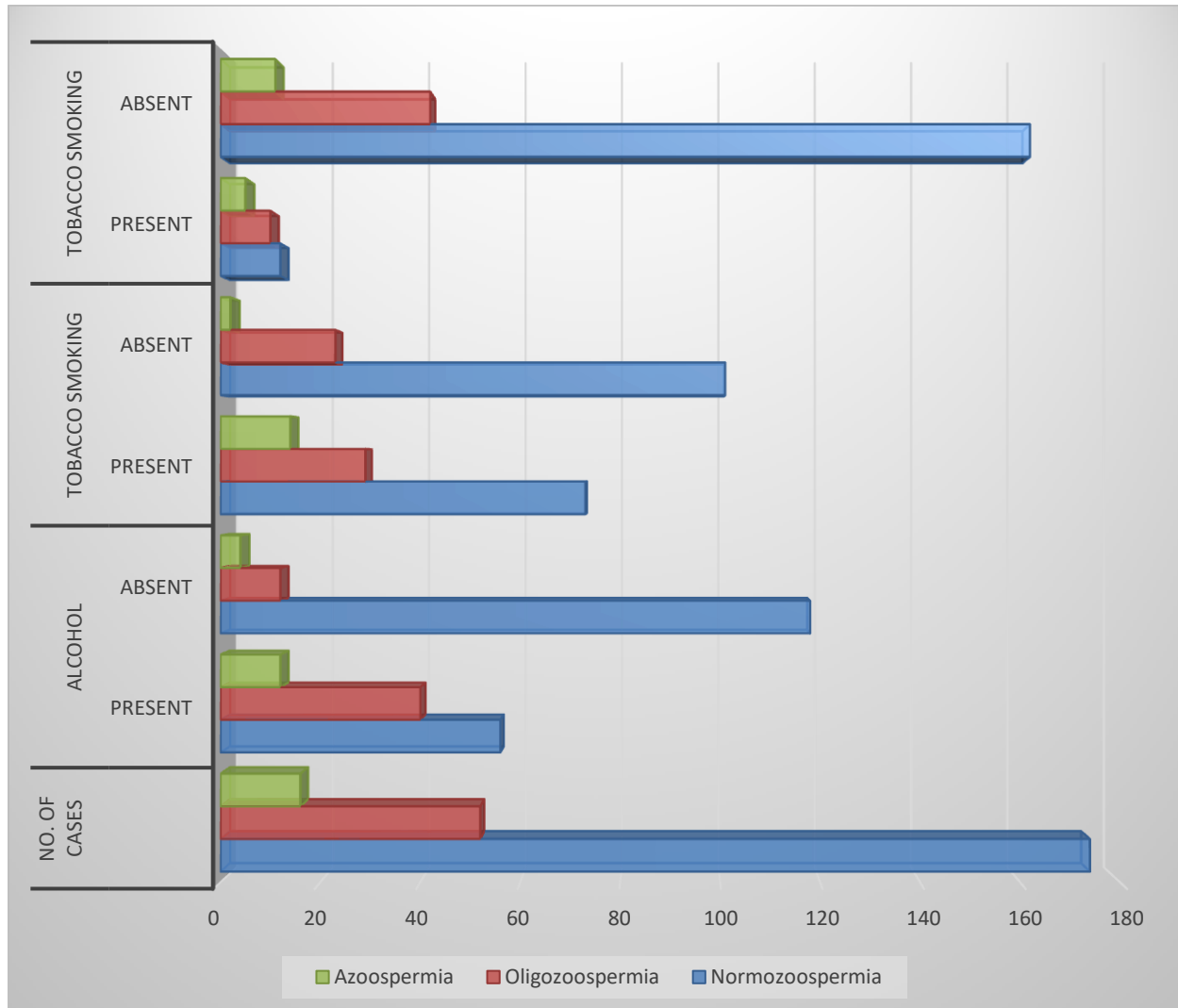


Fig. 3: Showing Association of lifestyle factors with various sema variables

Table 4 :Association of lifestyle factors with sperm motility

Motility	No. of cases	Alcohol		Tobacco smoking		Tobacco chewing	
		Present	Absent	Present	Absent	Present	Absent
Asthenospermia	84 (34.71%)	56 (66.66%)	28 (33.33%)	49 (55.33%)	35 (41.66%)	25 (29.76%)	59 (70.23%)

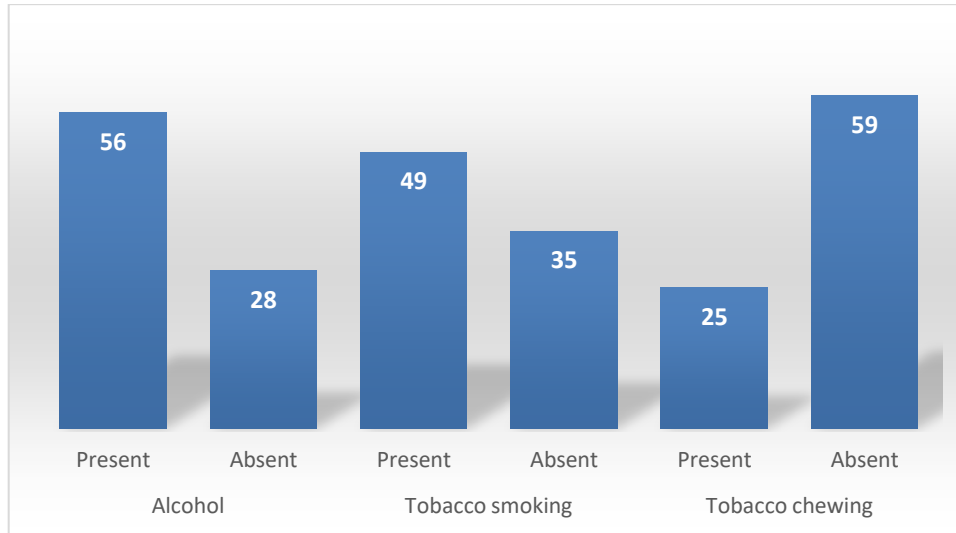


Fig. 4: showing accociation of lifestyle factors with sperm motility

Discussion

In the modern era, awareness to male aspect of infertility is gaining a lot of attention, because a lot of male partners are being consulted for semen analysis for infertility. This motivated us to investigate the association between high prevalent risk factors and the outcomes related to infertility. Male infertility plays a pivotal role in infertility almost in half of the infertile couples due to highly sensitivity to the various factors. The causes may either be genetic, lifestyle or environment factors and may be chemicals and physical substances generated by industrial or agricultural activities. Various studies have proven that neither medical nor surgical factors are implicated, and the etiology and pathogenesis remains unclear. Some ordinarily disputed drugs and medications may have been associated with detrimental results of semen parameters and male sexual performance due to exertion of gonadotoxic effect on the testicles, alteration of the hypothalamic–pituitary–gonadal axis,

impairment of ejaculation, erectile function and libido.[3,8,9] In this study we concentrated on the influence of certain lifestyle factors such as alcohol consumption, smoking and tobacco chewing, and their repercussions on male reproductive health. In the current study, the total sperm count and normal motility were significantly decreased among the lifestyle-exposed patients. In a recent study, most of the cases were of the age group of 18 to 30 years, which suggests that this particular age group is more prone to infertility presentation. Among the study subjects, sixteen (6.61%) were azoospermia, 52 (21.48%) oligozoospermia and the rest 174 (71.9%) had normal sperm count and total of 84 (34.71%) patients had asthenozoospermia. Analogous findings were observed in study of Sunil et al.[10] which showed 7.9% were azoospermic, 26.3% oligozoospermic, 65.8% normozoospermia and 36.7% patients were asthenozoospermic.

Alcohol consumption is the very common in India. Some studies shows that high-level alcohol has detrimental effect on the body including the

reproductive system. Alcohol gradually reduces the spermatogenesis, interferes with the production of GnRH, FSH, LH and testosterone as well as diminishes the functions of Leydig and Sertoli cells.[11,12] Data from some studies has also shown that the amount of alcohol has a dominant role on semen parameters. The men who consumes alcohol in large volume per day or in a week were found to have more effect on sperm count and motility. One study suggests that chronic and heavy amount of alcohol consumption leads to teratospermia and oligoasthenoteratospermia, ultimately resulting in azoospermia. Jensen et al. reported that moderate alcohol consumption does not impair semen parameters.[13-16]. In the present study, A total of 76.92% of the patients of alcohol habits had oligozoospermia. This result was similar to the study of Abhinav and Sunil et al. which suggested that oligozoospermia was much higher among alcoholics, which points towards the note-worthy relationship between alcohol consumption and infertility. Overall 32.18% of the alcoholics showed normozoospermia followed by oligozoospermia, azoospermia (75%) and asthenozoospermia (66.66%)-dominated alcoholics [Tables 3 and 4]. Similar findings were observed by Gaur and Abhinav et al.[6,10,17]

As stated by the WHO (2002), about one-third of the world's male adult population (above 15 years of age) indulge in smoking. Reports have suggested that there are a bunch of harmful chemicals substances present in tobacco smoke such as reactive oxygen species that suppresses the endogenous antioxidant defense mechanism, exposing the spermatozoa to oxidative stress and can also end up in the seminal plasma through various modes of diffusion and active transport. Consequently, it has negative effect on sperm parameters and ultimately compromises male fertility.[11,18] In the present study, the total sperm count and normal motility were significantly lowered among the tobacco-smoke-exposed patients, which reported 55.76% oligozoospermia and 58.3% asthenozoospermia. Some scientific studies have stated that smoking inhibits sperm production, sperm motility, sperm normal forms and sperm fertilizing capacity via increased seminal oxidative stress and DNA damage.[4,5] Few papers reported non-significant differences in semen parameters between smokers and non-smokers.[5,19]

One study reported that minimal to mild smoking does not pose any effect on sperm motility, whereas the moderate and heavy smokers had note-worthy low motility. But no significant effect on sperm count were

noted between the smokers and non-smokers. Furthermore, it was suggested that the relationship between smoking and sperm motility was dose-dependent.[4,20,21] There are total 30 mutagenic agents present in tobacco. Out of them, nicotine is most perilous, which gets absorbed through skin, mucous membrane, respiratory tract and finally metabolized through liver and degraded its products in serum, urine, saliva, milk and seminal plasma. Nicotine affects the sperm plasma membrane and genetic integrity by its powerful oxidizing actions. The present study reported mild association of tobacco chewing with 19.23% oligozoospermia and 29.76% asthenozoospermia. Priyadarsini et al.[22] in their study found oligo (66%) and asthenozoospermia (85%) were significantly high among the chewers as juxtaposed to non-chewer. According to the above, tobacco chewing may also has affect male infertility, but there is lack of clarity on the level of affection.

Conclusion

A variety of factors had detrimental predisposition to sperm quality. Overall this current study suggests that alcohol consumption, smoking and tobacco chewing may impact fertility. As far as lifestyle associations and factors are subjected under the light, major abnormalities are persistently reported due to alcohol consumption and smoking. Surprisingly, tobacco chewing has been associated with a low impact on reproductive system and sperm parameters. Therefore, It seems advisable to encourage the male subjects to change lifestyle factors before aiming to conceive, which will lead to better likelihood for natural conception and thus a positive outcome.

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