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Analysis of Risk Factors in Oligoasthenozoospermia Patients Reporting at Ayothidoss Pandithar Hospital, National Institute of Siddha, Tambaram Sabatorium (Tamil Nadu, India): A Cross Sectional Study

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Abstract: Infertility is a disease characterized by the failure to establish a clinical pregnancy after 12 months of regular and unprotected sexual intercourse. Oligoasthenozoospermia is a cause of male infertility. Oligoasthenozoospermia is a manifestation of spermatogenesis and functional maturation disorders. Spermatogenesis is a complex process in the testis including several important biological events, such as the proliferation of spermatogonia, the meiosis of spermatocytes and spermiogenesis. Oligoasthenozoospermia is characterised by decreased sperm count and sperm motility. This is a hospital based cross-sectional study conducted for 6 months. A total of 50 participants in age group of 25-50 years, were selected for the study. A semi-structured, self-administered questionnaire to assess the risk factors WHO – Audi Test, Designing Clinical Research, Schlegel Infertility Manual were used to analyse. A total of 50 participants were included in the present study; based on analyses of persons who smoked more than 100 cigarettes had p value <0.05 which is statistically significant, other features are statistically not significant. The study concludes that risk factors among Oligoasthenozoospermia, though smoking is significant in sperm motility but it is not significant in sperm count, if this study were conducted in large population it might be significant.

Keywords: Male infertility, Smoking, Alcohol, Comorbidities, BMI, Semen analysis

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Introduction

Infertility is a disease characterized by the failure to establish a clinical pregnancy after 12 months of regular and unprotected sexual intercourse. Clinical infertility is the inability of a couple to conceive after 12 months of trying. Male factors

are estimated to contribute to 30-50% of cases of infertility. Infertility is classified into two types (Chua *et al.*, 2023). These are- (i) Primary Infertility, and (ii) Secondary Infertility. Male infertility is a multifactorial syndrome. It is

estimated to affect between 8 and 12% of reproductive-aged couples worldwide. Males are found to be solely responsible for 20-30% of infertility cases but contribute to 50% of cases overall (Agarwal *et al.*, 2021).

Infertility or reduced fertility can result from testicular dysfunction, endocrinopathies, lifestyle factors (such as tobacco and obesity), congenital anatomical factors, gonadotoxic exposures and ageing, among others. The evaluation of male infertility includes detailed history, focused physical examination and selective laboratory testing, including semen analysis (Krzastek *et al.*, 2020). Although male infertility is recognized as a disease with effects on quality of life for both members of the infertile couple, fewer data exist on specific quantification and impact compared with other health related conditions. Oligoasthenozoospermia is a manifestation of spermatogenesis and functional maturation disorders. Spermatogenesis is a complex process in the testis including several important biological events, such as the proliferation of spermatogonia, the meiosis of spermatocytes and spermiogenesis ((Rangaiiah, 2023). Oligoasthenozoospermia is a major cause of male infertility; however, its etiology and pathogenesis are unclear and may be associated with specific gene abnormalities (You *et al.*, 2020).

Oligozoospermia is low sperm count, below 15 million sperm/ml whereas asthenozoospermia is abnormal sperm motility, with more than 60% of sperm being immotile, or unable to move in a straight direction. Establishing an unique cause of OA is difficult. As a matter of fact, it typically goes unnoticed by the man who suffers from it until he decides to have a baby (Ghosh *et al.*, 2012). The main aim of this study was to rule out the underlying causes for male infertility. Many studies conclude that comorbidities like diabetes mellitus, hypertension and other life style disorders might influence the process of sperm production. This study is mainly focused on the decreased count and motility for further clarification related to the oligoasthenozoospermia.

Materials and Methods

A Cross sectional study had been conducted at Ayothidoss Pandithar Hospital, Tambaram Sanatorium in Chennai, India. The study population were men with infertility who had defect in sperm count and sperm motility, with a known history of mumps, Diabetes Mellitus, thyroid dysfunction, habit of smoking and alcohol drinking. Men were enrolled and interviewed with the help of pretested semi structured standard questionnaire.

The inclusion criteria in this study were- (i) Reproductive age group between 25-50 years of age; (ii) Subjects having decreased sperm count and motility; (iii) Subjects who had history of Mumps; (iv) Subjects who have other known comorbidities like Diabetes Mellitus and varicocele; and (v) Subjects who are not willing to give consent for this study. The exclusion criteria in this study were- (i) Subjects who are not willing to give consent for this study; and (ii) Other abnormalities of sperm analysis.

Data Collection and analysis:

Data were collected from Semi structured Questionnaire method and Semen Analysis. It includes, Demographic information, questionnaire regarding the analysis – WHO – Audi Test, Designing Clinical Research, Schlegel Infertility Manual. The Questionnaires were in bilingual (Tamil and English) and easily understandable by common people. All collected data were entered into computer using MS excel software. The level of significance was set at 0.05. Then Descriptive analysis was made and necessary tables/graphs were generated to understand the profile of the subjects included in the study. The statistical analysis for significance of different characteristics were done using Linear Regression test for statistical calculations. The quantitative variables were presented as the mean and standard deviation.

Results and Discussion

A significant result was observed with respect to

Table 1: Sperm count

		AGE	HEIGHT	WEIGHT	BMI	6 DRINKS	100 CIGARETTES
N	Valid	50	50	50	50	50	50
	Missing	0	0	0	0	0	0
Mean		34.10	167.44	68.70	24.4940	1.74	0.56
Median		33.50	167.00	67.00	23.9000	2.00	1.00
Std. Deviation		5.932	9.152	9.532	3.08382	1.496	0.501
Maximum		48	190	89	32.90	4	1

Table 2: Sperm motility

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	17.967	12.398		1.449	0.154	-7.019	42.953
AGE	0.231	0.224	0.141	1.031	0.308	-0.220	0.683
BMI	-0.173	0.425	-.0055	-0.407	0.686	-1.029	0.683
DM	0.096	0.087	0.156	1.106	0.275	-0.079	0.271
THYROID	0.137	0.089	0.207	1.539	0.131	-0.042	0.315
100 CIGARETTES	-6.891	2.744	-0.354	-2.512	0.016	-12.420	-1.361

Dependent variable Estimated sperm motility (Y) = 17.967+0.231 age – 0.173 BMI +0.096 DM+0.137 THYROID-6.891(100 Cigarettes)

smoking habits in the participants who had consumed more than 100 cigarettes in their life period influencing the motility of the sperms (Tables 1, 2). Though the other factors were not statistically significant for both the number and the motility, as the study population was small, these factors were also to be considered as risk factors.

The ultimate aim of the study was to analyse the risk factors among oligoasthenozoospermia cases. So a cross sectional study was conducted at Ayothidoss Pandithar Hospital, National Institute of Siddha at Tambaram Sanatorium Chennai,

India. In this study male age group of 25-50 were enrolled. Most of the men were found to be in category of primary infertility. In this study patients who are smoking more than 100 cigarettes in their lifetime were found to get defect in their sperm motility which is statistically significant but their sperm count is not affected. Other than this patients who had history of mumps, diabetes mellitus, varicocele, thyroid dysfunction, seizures, cryptorchidism, inguinal hernia, scrotal trauma are not significant in this study (Al-Kandari *et al.*, 2020). Data were collected from structured Questionnaire method

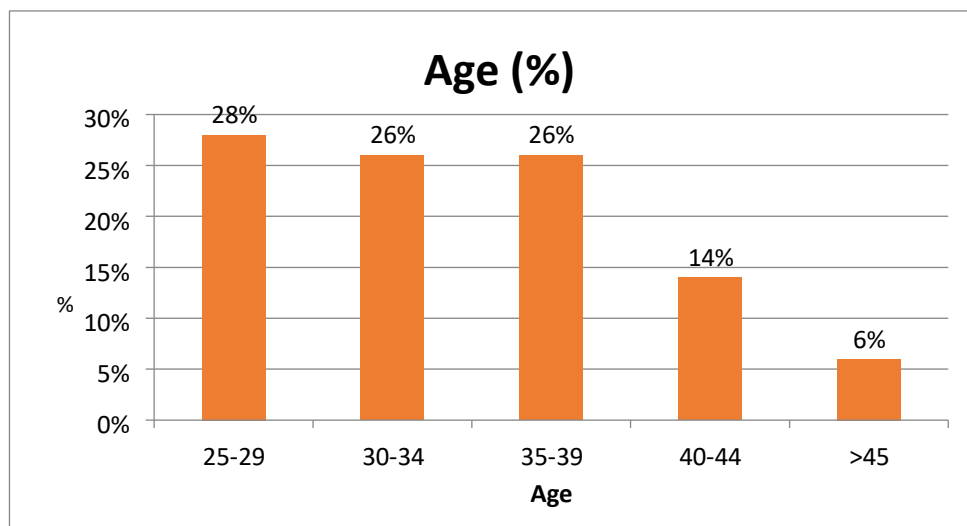


Fig. 1: Age of patients.

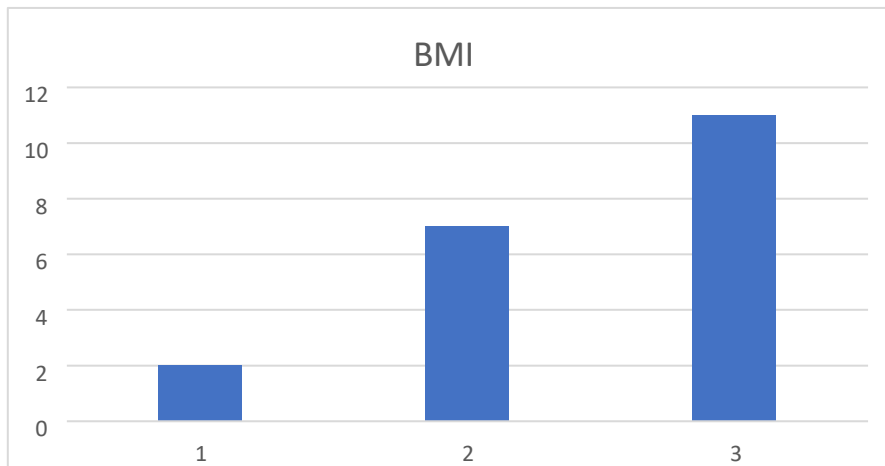


Fig. 2: BMI of patients (1=Lean; 2= Normal; 3+ Obese).

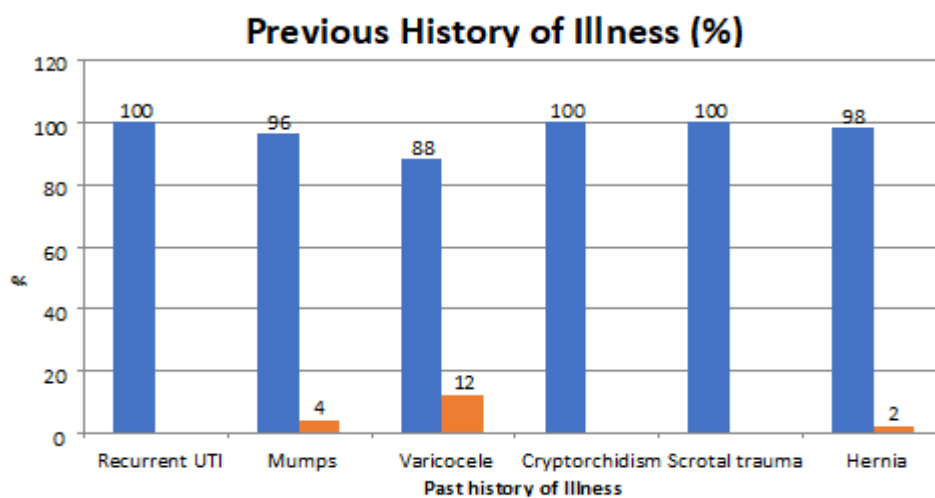


Fig. 3: History of past illness of patients.

and Semen Analysis.

In the age criteria, 25-29 years old male patients are found to be 28 per cent, 30-34 years old male patients are found to be 26 per cent, 35-39 years old patients are found to be 26 per cent, 40-44 years old male patients were found to be 14 per cent, and 45-50 years old patients are found to be 6 per cent. The oligoasthenozoospermia group did not show the increase of STL (Sperm Telomere length) with age that is seen in Normozoospermia individuals, suggesting that telomere length elongation mechanisms fail in oligoasthenozoospermia patients. In PBMC (Peripheral Blood Mononuclear Cells), younger oligoasthenozoospermia individuals showed significantly shorter mean telomere length, suggesting that this parameter could be a good biomarker for oligoasthenozoospermia in younger patients. Telomerase gene and TRF1 (Telomere Restriction Fragment) mRNA expression and TRF1 protein immuno-reactivity did not differ significantly between groups, and so these factors cannot be used as oligoasthenozoospermia risk factor.

According to those patients who smoked more than 100 cigarettes in their life time is more significant in this study. A previous study (Künzle *et al.*, 2003) too confirms that smoking causes infertility. A population-based study of the epidemiology and the risk factors for male infertility in Kuwait has reported that the risk factors of male infertility include positive family history, smoking, and varicocele (Al-Kandari *et al.*, 2020). But varicocele was significant in this study, if this may be conducted in large population it might have been significant.

A study conducted at the University of Queensland, Brisbane, Australia, concluded that Obesity has been significantly increasing over the recent decades (Ameratunga *et al.*, 2023). There is substantial evidence that obesity is associated with reduced fertility in men. But in this study it was not significant, if this study was conducted in large population it might be significant (Chua *et al.*, 2023).

Conclusion

The study concludes that smoking influences the functional maturation of the sperms that accounts for Male Infertility. If the study is planned in a large population, it would have resulted with more significant risk factors for Oligoasthenozoospermia.

Ethical Statement

Ethical clearance was obtained from Institutional Ethics Committee, National Institute of Siddha (12/07/2023; NIS/24/IEC/2023/MP/46) and CTRI Registration was done (CTRI/2023/08/072269) prior to the conduct of the study.

Author Contributions

Poonguzhal Isaikavi helped to enroll the cases, editing of manuscript; Sneka helped to consolidate the cases and analyzing the result; Meenakshi Sundaram supervised throughout the study, editing of manuscript; Karunya planned the study, analyzed results and writing manuscript. All authors have read and agreed to the published version of the manuscript.

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Conflict of Interest

The authors declare no conflicts of interest.

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