



## Abnormalities in Semen Analysis among Male Partners of Infertile Couple

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### Abstract

**Background:** Male infertility is an important cause of infertility with a strong impact on psychology and physiology of the couple. Male factor as a cause of infertility is present in 20 – 50 % of cases, hence the importance of an integral evaluation of the male factor infertility.

**Objective:** Our study aims to assess the seminal parameters of male partners of infertile couple.

**Materials & Methods:** This retrospective study was conducted on male partners of 200 infertile couples who attended the clinic. Data regarding history, physical examination and seminal parameters were taken from the case records. Semen was collected by masturbation in all cases in to a clean, dry container. After liquefaction, basic analysis was done which included volume, density, Ph, sperm concentration, motility and morphology.

**Results:** The incidence of male infertility in our series was found to be 39 %. Out of the 75 cases with abnormal semen parameters, 55 % had oligospermia.

**Conclusion:** Male factor infertility is an important cause of infertility in our population. 41/75 cases belonged to 21 to 30 year age group. Azoospermia contributed to 55% of cases.

**Keywords:** Semen analysis, Azoospermia, sperm motility.

### Introduction

According to the International Committee for Monitoring Assisted Reproductive Technology, World Health Organisation (WHO), infertility is a disease of the reproductive system defined by failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse <sup>[1]</sup>. The prevalence of infertility in general population is 15 – 20 %. Out of this, male factor is responsible for 20 – 40 % of cases <sup>[2]</sup>. In Indian couples seeking treatment, male factor is the cause in approximately 23 % <sup>[3]</sup>. It may be one or a combination of low sperm concentration,

poor sperm motility or abnormal morphology. The rates of infertility in less industrialised nations are markedly higher and infectious diseases are responsible for a greater proportion of infertility. As a man's fertility relies on the quantity and quality of his sperms, semen analysis is generally used as a proxy to estimate fertility in males. Male reproductive impairment might result from factors that affect sperm production, function or transport. Although in most males, the origin of infertility remain unexplained, genetic causes are increasingly being discovered.

Men with semen parameters below the WHO normal values are considered to have male factor infertility<sup>[4]</sup>. The most significant of these are low sperm concentration (oligospermia), poor sperm motility (asthenospermia), and abnormal sperm morphology (teratospermia). Other factors are seminal volume and other seminal markers for epididymal, prostatic and seminal vesicle function<sup>[5]</sup>. As high as 90 % of male infertility problems are related to count and there is a positive association between abnormal semen parameters and sperm count<sup>[6]</sup>. The problem in sperm count, motility and morphology stems from disarray in control mechanisms including pre-testicular, testicular and post – testicular factors<sup>[7]</sup>. Hence semen analysis remains the single most useful and fundamental investigation with a sensitivity of 89.6 %, that it is able to detect 9 out of 10 men with a genuine problem of male infertility.<sup>[8]</sup> It is a single test that assess the formation and maturity of sperms as well as how the sperm interacts in the seminal fluid. It also provides insight not only on sperm production, but the sperm quality as well.

The WHO has revised lower reference limits for semen analysis. The following parameters represent the accepted fifth percentile derived from a study over 1900 men whose partners had a time to pregnancy of  $\leq 12$  months. The revised criteria is as follows:

1. Sperm concentration – 15 million spermatozoa per ml
2. Total sperm number – 39 million sperms per ejaculate
3. Morphology – 4 % normal forms
4. Vitality – 58 % live
5. Progressive motility – 32 %
6. Progressive + non-progressive motility – 40 %

#### **Abnormal seminal fluid analysis**

Oligozoospermia – Reduced sperm numbers.

Asthenozoospermia – Reduced sperm motility.

Teratozoospermia – Increased abnormal forms.

Oligoasthenoteratozoospermia – All sperm variables are subnormal.

Azoospermia – No sperm in semen.

Necrospermia – All the spermatozoa present are dead.

The objective of this study was to evaluate the seminal parameters in infertile men.

#### **Materials and Methods**

This is a retrospective study which included 200 couples registered for infertility. Data was collected from the case records of these patients. Those with normal semen parameters were excluded from the study. In all cases with abnormal semen parameters, detailed history and clinical examination of the male partner was performed.

Infertile couples who were living together for more than one year and had regular unprotected sexual intercourse were included in the study. Patients having erectile dysfunction due to beta blockers, psychological causes like performance anxiety, stress, clinical depression etc were excluded.

Semen was collected after a 3 day abstinence period by masturbation into a wide mouthed clean container. The semen samples were allowed to liquefy and the time to complete liquefaction noted. Sperm count, motility, and abnormal morphology are studied in detail. The volume of the sample was measured in a graduated tube. PH of semen was measured using PH paper. The viscosity was measured by gently aspirating it into a pipette allowing the semen to drop by gravity and observing the length of any thread. Motility was estimated by mounting a drop of liquefied semen on a slide and covering it with a cover slip. Sperm count was done in Neubauerchamber. After liquefaction, thin smears were prepared and PAP staining done to study morphology of sperms.

The findings were recorded and analysed as per WHO guidelines for semen analysis.

#### **Results**

In this series, 200 couples seeking advice for infertility were included. 75 men were found to be having abnormal seminal parameters and the

incidence of male infertility was calculated to be 39 %.

Maximum number of patients were between 21 - 30 years (55%).

**Table 1 .** Distribution of infertile men according to the age

Age group in years	Azoospermia	Oligozoospermia	Others	Total number	percent age
21 - 30	21	17	3	41	55 %
31 - 40	17	12	0	29	39 %
41 - 50	3	2	0	5	6 %

58 % of patients sought medical help between 6 and 10 years of marriage. Only 17.5 % of men came for investigation and treatment within five years of marriage.

**Table 2 .** Distribution of men according to duration of infertility

Duration of marriage	Number	percentage
1 – 5 years	13	17 %
6 – 10 years	43	58 %
11 – 15 years	14	18 %
16 – 22 years	5	

Incidence of azoospermia was found to be the most common semen abnormality (55%) .

**Table 3 .** Distribution of men according to the type of seminal abnormality

Type of seminal abnormality		
Azoospermia	41	55 %
Oligoasthenospermia	31	41 %
Necrospermia	1	1.35 %
Aspermia	1	1.35 %
Pyospermia	1	1.35 %----- ---

**Discussion**

In our series it was found that male factor was responsible in 39 % cases as a cause of infertility. Roland reported an incidence of 40 % [9] and Raymont et al reported an incidence of 31.5 % [10].

The type of semen defect was azoospermia in 55 % of cases. Ugboaja et al studied the pattern of seminal fluid abnormalities in Eastern Nigeria over a period of 12 months. They observed that asthenozoospermia (16.7 %) was the single main abnormality followed by oligoasthenozoospermia (14.7 %) [11]. Salgado et al observed that asthenozoospermia was present in 8.89 % cases [12].

In our series, majority of infertile couples with semen defects were in the age group 21 – 30 years ( 55 % ). Warner in his 25 years of study of 1553 couples found that the mean age of men among infertile couples was 33.1 years [13]. Cates et al observed that majority of couples with male factor infertility were between 25 – 34 years of age [14].

In our series, the incidence of semen defect was highest among couples with duration of infertility 6 – 10 years (58 %) . Warner reported that 33 % of his patients were married for 3 – 5 years [13].

Time and again various studies have been published supporting a decline in sperm quality or dismissing the same. Analysis of retrospective data indicate that the sperm counts may have been declined in some parts of the world, but there seems to be geographical variations in the semen quality [15,16 ]. The reasons for the geographical variations in semen characteristics is not clear, but may be due to environmental, nutritional, socioeconomic or other unknown causes. This decline in semen quality coincides with an increasing incidence of abnormalities of the male genitaltract including testicular cancer and cryptorchidism in various countries.

Ageing is an important factor responsible for the decline in semen quality. 90 % of seminiferous tubules in men in their twenties and thirties contained spermatids, whereas men in their forties and fifties had spermatids in 50 % of the seminiferous tubules. Semen motility and morphology appear to decrease with advancing male age [5]. In utero exposure to exogenous estrogenic compounds are capable of altering neonatal testicular development and reducing sperm production in adult men [17].

### Conclusion

The incidence of male factor infertility in this series was 39 %. Azoospermia was the most common type of semen defect in these infertile men followed by oligoasthenospermia. Majority of men with abnormal semen parameters were in the age group 21 to 30 years. Abnormal semen parameters were detected more in couples with duration of infertility 6 – 10 years.

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